Saskatchewan Information Technology Sector Partnership

Education and Training Needs Assessment

June, 2001

FINAL REPORT

Acknowledgements

The Information Technology Sector Partnership Steering Committee (Steering Committee) expresses its appreciation to all the organizations, businesses and individuals that have contributed time and effort to make this study possible.

This report would not have been possible without the participation of the businesses and individuals who took time to meet and speak with the researchers on many aspects of the Saskatchewan information technology industry. We thank all those who participated in the survey and focus group presentations.

Members of the Steering Committee are to be commended for the time, effort, guidance, and support they contributed to the research and writing of this report. Their knowledge and commitment to the industry was invaluable throughout the study.

The funding for this research project was provided by Saskatchewan Post-Secondary Education and Skills Training (PSEST) through the Sector Partnerships Program. The role of PSEST is gratefully acknowledged and, while PSEST was extensively involved in the study, the views expressed in this report are those of the industry and the industry stakeholders.

103-05606/

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Executive Summary

Introduction

Trimension Group together with the Canadian Information Processing Society of Saskatchewan (CIPS Saskatchewan), the provincial society which is associated with CIPS National, on behalf of individuals in the industry, submitted a proposal to Saskatchewan Post-Secondary Education and Skills Training for funding under the Sector Partnerships program. Funding provided the opportunity for industry and key stakeholders to work together with a primary objective to address training needs and human resource planning in the industry.

A Steering Committee comprised of industry representatives, key industry stakeholders and education and training providers was formed to work with and direct Trimension Group in carrying out the research components, analysis, and preparation of the final report.

To develop and implement appropriate strategies for a proactive human resource plan for the industry, the Steering Committee undertook a needs assessment of the Information Technology (IT) industry. The objective was to identify current human resource and training needs and also look at future requirements in the industry. This report presents the results of the research.

Methodology

Trimension Group carried out both qualitative and quantitative primary and secondary research as part of the study. Primary research results were validated through focus groups conducted with participants involved in the industry.

The following provides a brief description of the steps taken to complete the study and produce the final report:

Literature Review

A literature review was completed with the objective of providing the Steering Committee with background information necessary to establish a base for the human resource and training needs assessment. The information for the literature review was obtained from various sources including published and unpublished reports.

Education and Training Database

Research was conducted to develop and compile a database of education and training programs for the Saskatchewan information technology industry. The database outlines education and training programs that are applicable to the information technology industry. The database includes programs offered across Saskatchewan and identifies the institution and contact information. The results indicate a more comprehensive database should be developed in order to promote awareness of all the training programs and courses that are already available.

Industry Survey

Trimension Group developed two survey instruments in consultation with the Steering Committee. The first survey was conducted by e-mail or fax between August and December, 2000. Sixty completed surveys were received. A second survey was administered by telephone

during the month of March, 2001, and 284 interviews were completed. As well, two completed surveys were received by fax. A total of 346 e-mail, fax and telephone interviews were completed between August, 2000 and March, 2001. All the interviews were completed in-house by Trimension Group.

Industry Validation

In April, 2001 two focus groups were completed as part of the qualitative research to validate the survey results. The focus groups were made up of employers and were held in Saskatoon, and Regina.

Key Findings

Key findings gathered from the research provide an overview of the industry and summarizes the results of the human resource and training needs of the Information Technology industry organizations. The key findings from the Literature Review and the Needs Assessment study are as follows:

Literature Review

The Literature Review is consistent of a review of various reports that have been published both provincially and nationally on the Information Technology Sector.

Components of the Information Technology Sector

- The sector is divided into two main components: manufacturing and service.
- In Saskatchewan it is estimated that there are 247 Information Technology companies employing over 10,000 people.
- There are an undetermined number of companies who have IT departments and/or employees performing support to the main core of the business.
- Previous studies in Saskatchewan indicate there were shortages of graduates and qualified graduates.
- The IT industry in Saskatchewan has been one of the fastest growing sectors in the provincial economy over the past number of years.

Education and Certification

- There is a perception within the industry that post-secondary education and training does not fully prepare students for jobs in the industry.
- The Canadian Information Processing Society (CIPS) is the largest Canadian association that represents Information Technology professionals. CIPS has developed the Information Systems Professional (I.S.P.) designation.
- The Software Human Resource Council (SHRC) in co-operation with CIPS and the industry developed the Occupational Skills Profile Model (OSPM) to describe the skills and responsibilities associated with 24 occupational streams in the software industry.

Needs Assessment

The following summarizes the key results from the telephone survey and the focus groups.

Employment Trends

- Fifty companies indicated they currently have vacant IT positions. These occur in the areas of programming, software development, network engineers, web-based application development, computer support and business analysis and design.
- Respondents indicated the major difficulties in recruiting IT employees are the lack of applicants with relevant experience, a lack of applicants with required skills, and the inability to offer competitive wages.
- The three most common difficulties experienced by the industry in recruiting are location, salary and training.
- Companies that were surveyed still recruit the majority of their employees from within the province.
- Due to the economic downturn in the high tech sector there has been a softening in the employment growth projections. In spite of this, there appears to be opportunities of growth as multi-task resource persons and sales personnel. These two occupations reflect a shift away from the more technical/programming type positions.

Recruitment and Retention

- Employee retention does not appear to be an issue for the majority of companies surveyed.
- Those companies who stated retention was an issue in their organization were mainly businesses and organizations that employ IT workers to support their operation, not IT companies.
- The main reason given as to why employees leave a company is voluntary leave.
- Of those who leave voluntarily, better opportunities elsewhere in Saskatchewan was the main reason given.
- The 25-34 age group has, by far, the most number of full-time and part-time employees.
- By and large, the lack of a skilled workforce is not compromising business growth of the companies that were surveyed in the Information Technology industry.
- Employers tend to recruit the majority of their employees from within the province.

Skill Requirements and Training

- Just over one-third of the companies surveyed indicated having difficulties in providing ongoing training to their employees.
- The three most common reasons for this difficulty were lack of time, lack of resources (both human and/or monetary) and lack of training available in the province.
- A combination of in-house and external training was identified as the best way to provide employees with ongoing skill development.
- Over two-thirds (67%) of the companies surveyed indicated the education and training programs offered in Saskatchewan meet their hiring needs.
- Fifty-six percent (56%) of the companies surveyed indicated that existing education and training programs offered in Saskatchewan meet their ongoing training needs for existing employees.

Equity Participation

- Of the companies surveyed, men predominantly occupy Information Technology positions.
- Based on the survey results, 1.75% of the Information Technology workforce are aboriginal, 1.2% are persons with disabilities, 4.4% are visible minority persons, and approximately 20% are women.
- The industry is under represented in all categories, other than men, against the provincial workforce participation average.

Certification and Professionalism

- Almost 75% of those surveyed were not familiar with the CIPS I.S.P. designation.
- Over 80% of those companies surveyed do not seek I.S.P. designation when recruiting.
- Forty-five percent (45%) of those who responded look for other types of certification when recruiting new employees.
- Fifty-five percent (55%) of those same respondents encourage employees to obtain other types of certification.

Recommendations

The following recommendations were developed by the Steering Committee. Implementation of these recommendations will be the responsibility of the Steering Committee in partnership with their stakeholders.

1. The Steering Committee investigate the possibility of establishing a permanent body to implement and co-ordinate the needs identified in this study.

Strategies

- **Develop a mechanism to bring industry and stakeholders together to discuss common issues and needs.**
- **Develop ways to co-ordinate the training that is needed by industry so training is more accessible and affordable through sharing costs.**

2. The Steering Committee review its membership to enhance the representation on the Steering Committee.

Strategies

- **Identify potential new members on the Steering Committee.**
- **Saskatchewan Advanced Technology Association (SATA) be approached to become a partner.**

3. Develop a communication strategy to promote the results of this study and the on-going work of the Steering Committee.

Strategies

- **The Steering Committee will meet to discuss and develop a communication plan to promote the Sector Partnership.**
- **Present members of the Steering Committee will distribute copies of the Executive Summary to their stakeholders.**
- **The full report will be distributed to all Steering Committee members.**
- **CIPS Saskatchewan will present the results of the study nationally within CIPS.**

4. The Steering Committee identified there is a need to promote an awareness of the Information Technology education and training programs/courses available in the province for employers and IT managers.

Strategies

- **Create a comprehensive education and training database.**
- **Determine a method for upgrading, maintaining and distribution of this database.**
- **Promote and raise awareness of IT Conferences and Workshops that are available for the industry.**
- **The Steering Committee in partnership with key employers co-ordinate the organizing of relevant conferences.**

5. The Steering Committee recognizes there is a need to market and promote the career options available. Also, to encourage and increase participation of women, visible minorities, persons with disabilities, youth and aboriginal peoples in the workforce.

Strategies

- **Create an awareness of career options by working with the K-12 school system to promote the industry.**
- **Identify other stakeholders that should be included and work with them.**
- **Promote the value of Science fairs and participate in them.**
- **Offer mentorship and on-the-job training to students to address the increased competition there is for them.**
- **In partnership with other stakeholders, SIAST, the Universities, the Aboriginal institutions, regional colleges and the industry, develop opportunities to increase the participation of aboriginal people, women, youth, visible minorities and person with disabilities in the IT industry workforce.**

6. The Steering Committee in partnership with CIPS Saskatchewan will work to raise the awareness of the accreditation and certification options available.

Strategies

- **CIPS Saskatchewan as a member of the Steering Committee will develop a strategy to promote the benefits of accreditation and certification.**
- **Create and make available a comprehensive database of options for employers..**

7. The Steering Committee needs to facilitate and conduct follow-up survey and research work to ensure trends and changes that are occurring are captured and addressed.

Strategies

- **Research what's happening in other provinces and internationally.**
- **Monitor the current market demand to anticipate and prepare for change.**

8. The Steering Committee and industry establish a mechanism with the education and training providers in the province on ways to promote the manner in which programs and courses are offered, what programs are already available and the skill sets graduates of these programs and courses leave with.

Strategies

- **The education and training providers work with the Steering Committee to develop the process.**
- **A more effective communication and promotion plan is needed in order for employers to become better informed.**
- **Education and training providers need to be participants in the discussions that take place in order to be better prepared to provide graduates with the skill sets to meet industry needs.**

9. The Steering Committee in partnership with industry and other stakeholders need to work together to develop strategies to address recruitment and retention, professional development and business growth.

Strategies

- **Set up separate task teams to focus on each area separately.**
- **Bring in experts who can assist in addressing these issues through their experiences in what was done elsewhere or for other sectors.**
- **Hold focus groups to garner input and feedback.**

Next Steps

Over the next six months, the Steering Committee, in partnership with CIPS Saskatchewan, industry, training providers and other key stakeholders will:

1. Develop a communication strategy to ensure communication of the results of the needs study is distributed to as wide an audience as possible.
2. The Steering Committee needs to explore potential funding and resource sources as well as partnership contributions to sustain themselves in order to carry on and implement the recommendations and next steps.
3. Research the education and training database and the most appropriate manner in which to maintain and up-date it regularly.
4. Review the existing membership of the Steering Committee.
5. Develop a marketing strategy that will promote the industry.
6. Develop a marketing strategy that will aid in increasing the participation rate in the workforce for women, aboriginal people, visible minority people and persons with disabilities.

The process to address these next steps is as follows:

- The Steering Committee will arrange a meeting of the Steering Committee to discuss these next steps and how they will be addressed.
- The Steering Committee will identify who should be approached to join as a member of the Steering Committee. A potential new member is the Saskatchewan Advanced Technology Association (SATA).
- The Partnership will discuss ways of continuing the Steering Committee through sharing the costs of meetings, chairing the meetings, developing proposals for financial support and identifying who should assume a greater leadership role.
- The Steering Committee will finalize the details of an effective communication plan.

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1.0 Introduction

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To develop and implement appropriate strategies for a proactive human resource plan for the industry, the Steering Committee undertook a needs assessment of the IT industry. The objective was to identify current human resource and training needs and also look at future requirements in the industry. This report presents the results of the research.

2.0 Literature Review

2.1 Introduction

Information Technology (IT) may be considered the driving force in the global economy. The Information and Communications Technology (ICT) sector almost defies definition because of the revolutionary impact on the entire economy. Fundamental changes in the capability, cost and availability of information technologies are altering markets in virtually all industries. In the past 20 years, there has been a surge in jobs associated with managing information networks and systems in virtually all sectors of the economy and computers have become standard work tools for a large and growing proportion of the work force.[1]

The economic importance of information and communication technology continues to grow. ICT intensity (ICT expenditures/GDP) is rising in Organization of Economic and Co-operative Development (OECD) countries and reached almost 7% on average in 1997. It is particularly high in English-speaking countries, Sweden, Switzerland, Japan and the Netherlands. The strong growth in ICT is mainly driven by growth in telecommunications equipment and services. Firm-level data suggests that the IT industry (excluding telecommunications) continues to undergo rapid restructuring; although hardware is still the largest segment, data communications play an increasing role.[2]

Whether the sector is considered as Information Technology (IT), Information and Communications Technology (ICT), or High Tech (HT), it is clear the world economy is changing as a result of the rapid and ongoing changes in this sector. Canadians now perceive the

[1] Profile of the Information and Communications Technologies Sector – Prepared for the Expert Panel on Skills by Timothy Denton and Bert Pereboom. 1999.
[2] OECD Information Technology Outlook 2000: Highlights – www.oecd/dsti/sti/it/prod/IT2000Highlights_e.htm

information technology sector as the most important contributor to growth in the Canadian economy. This represents a strong change in Canadians' perceptions as they embrace technology as a legitimate economic force.[3]

The ever-increasing use of the Internet and the emergence of e-commerce are transforming the way people and firms do business. E-commerce may be defined as the buying and selling of goods and services using electronic networks, including the Internet. More importantly, it is revolutionizing the way business can reach new customers while more adequately fulfilling the needs of pre-existing ones. Furthermore, the cost-effectiveness of electronic commerce enables small companies to compete on an even footing with far larger organizations. At the same time, larger companies can utilize e-commerce to instantly respond to evolving trends and enter new markets with the agility of a small business.[4]

However the IT industry is defined it clearly affects all segments of the economy. Gaylen Duncan, President and CEO, ITAC stated in a speech on May 15, 2000: " We can no longer try to address issues concerning only the IT sector or industry. IT has become part of all companies in Canada. IT must be recognized as part of the tools required by all sectors to compete nationally and internationally as a key source of productivity improvement. Convergence of technology has caused a blurring of line that traditionally separated businesses. Financial institutions, power utilities and even catalogue shopping companies have communications capabilities and networks that challenge those of the phone companies. The lines that used to delineate businesses are so blurred, we may wake up one day and have our banks become our phone companies and phone companies become our power distributors. It appears to be impossible to fence technology; to artificially maintain distinctions between lines of business."[5]

Growing use of computer networks and the Internet has driven hardware markets. PCs and workstations now represent one-half of the hardware market, and data communication equipment is well over 10%.[6]

2.2 Canadian IT Sector

Industry Canada refers to the sector as the Information and Communications Technologies Sector (ICT) and is using the new OECD definition for the ICT sector. The sector is segregated into manufacturing and services segments. The components of the sector are as follows:

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[3] ITAC – Canadians View IT Sector as Most Important to Economic Growth
http://www.itac.ca/client/itac/ITAC_UW_M...4639E6EB852568F50066A28F?OpenDocument
[4] IBM Public Affairs – Living in the Information Society –
http://www.ibm.com/ibm/publicaffairs/ecommerce/index.html
[5] Information Technology Association of Canada – http://www.itac.ca
[6] OECD Information Technology Outlook 2000: Highlights –
http://www.oecd.org/dsti/sti/it/prod/IT2000Highlights_e.htm

Information & Communications Technology Sector	
Manufacturing	**Services**
• Consumer electronics. • Communications & telecommunications equipment. • Electronic components. • Computer equipment. • Communications wires & cables. • Instrumentation.	• Cable television. • Telecommunications services. • ICT wholesaling. • Software and computer services. • Office machinery rental & leasing.

Highlights of the Canadian ICT sector as reported by Industry Canada are:

- ICT revenues reached $100.2 billion in 1997, an increase of 5.4% from 1996;
- services accounted for 72% of all ICT revenues;
- revenues for the entire ICT sector have grown at a compound annual rate (CAGR) of 8.5% for 1990 – 1997 period;
- total employment in the ICT sector was 481,046 in 1997, a net increase of 10.% or 44,047 more jobs from the previous year (compared to a 1.9% increase in total Canadian employment);
- the number of jobs in the ICT industries rose from 391,000 in 1990 to 481,046 in 1997, an increase of 23.1% (3.0% annual growth, compared to 0.8% economy-wide);
- most of the gains in employment have occurred in software & computer services, where employment is 2.5 times higher in 1997 than in 1990;
- despite the strong growth in exports, Canada's ICT sector has a large and growing trade deficit.

In Saskatchewan the availability of economic indicators are limited. The industry, at this time, may be summarized as follows:[7]

- the industry employs 10,000 people in approximately 247 companies;
- one of the fastest growing industries with an annual growth rate of more than eight percent;
- the sector earns $1.6 billion annually.

In Alberta over the last five years output from the ICT sector has grown 10 to 12 percent annually. Informed trade sources place Alberta's 1997 output at roughly 11 percent of Canadian gross output. Annual R&D expenditures are in the order of $210 million.[8]

[7] Saskatchewan Economic Development – Sector Overview
[8] A Strategy for Information and Communications Technology in Alberta – http://www.gov.ab.ca/publicdocs/ict/ICTcore03.html

Recognizing the boom and bust cycle of resource based economies Alberta has developed a strategy for the ICT sector where highly skilled people are considered the natural resource. As part of the strategy to employ 140,000 Albertans in the sector by 2010 a recommendation has been made for a doubling of ICT skilled knowledge workers through post secondary education[9]

In British Columbia employment in the high tech sector was up from the previous year. In 1999, 52,060 workers were employed in the sector, up 10% from 1998. Employment growth in BC overall during 1999 was limited to 0.1%.[10]

2.3 IT Skills Shortage

The IT skill shortage is often mentioned as inhibiting the growth of the IT sector in various jurisdictions. Not all views on this issue are consistent.

A survey done in Saskatchewan in 1997 was completed for the Software Technology Centre with a purpose to provide a better understanding of the business climate in Saskatchewan's IT industry.[11] Some of the key conclusions reached were:

- the biggest issue facing Saskatchewan's IT industry was the shortage of people/grads or qualified people/grads;
- across all companies interviewed a total of 479 IT positions are available. Prorated across all 187 identified IT companies in Saskatchewan the total number of IT positions currently available provincially would be approximately 785.

In Alberta, stakeholders estimate as many as 2,000 ICT related jobs are currently available in Alberta. Major players like IBM and Nortel state their Alberta-based operations would expand with the availability of qualified computer programmers or wireless technology engineers.[12]
In Prince Edward Island a recent study revealed businesses anticipate a rapid growth in IT staffing to 1220 full time equivalent IT positions by the end of 2000 from 580 positions at the time of the survey.[13] The study identified the following potential staffing barriers to growth of IT in the private sector:

- a lack of skilled resources;
- the small size of many IT businesses and departments;
- the need for, but shortage of, workers with 3-5 years experience;
- higher IT remuneration packages outside PEI;
- a lack of critical mass in the IT industry.

[9] A Strategy for Information and Communications Technology in Alberta
[10] Profile of the British Columbia High Technology Sector. A joint project of BC Stats and the BC Information, Science and Technology Agency.
[11] Survey Results – Information Technology Market Research – Douglas Bates – December, 1997.
[12] A Strategy for Information and Communications Technology in Alberta.
http://www.gov.ab.ca/sra/publicdocs/ict/ICTcore03.html
[13] ITAP – Information Technologies Association of Prince Edward Island – Information Technology Staffing & Skills Survey, January, 1998.

In more recent studies and research conducted in Canada and the United States there is an indication that due to the market there is a softening on the demand side. Information Technology managers now can afford to be more selective in the recruitment of IT workers. Even though managers and companies are feeling less pressure to fill positions at the pace that was happening, this industry is still seen as one of continuous growth.

A recent report out of the United States and a paper entitled "Global & National Economic Trends: Implications for Saskatchewan", (March 21, 2001) both suggest continued growth and demand for IT workers.

The Saskatchewan report states:

> "It was suggested that in three years more than 65% of business will be done on-line, increasing the need for expertise in Information Technology (IT)."

It goes on to state:

> "In the Saskatoon area alone 65 software engineers will be needed over the next two years."

The skill shortage is not just restricted to the Canadian market, but is being felt globally, and most acutely in North America. An additional challenge facing the Canadian ICT industry is the 'brain drain' of technology workers across all sectors who are enticed away to the United States for higher wages and benefits.[14]

In the United States there was reported demand for approximately 1.6 million IT workers in the year 2000. With demand for appropriately skilled people far exceeding supply, half of these positions will likely go unfilled.[15]

In a recent study completed in the Silicon Valley revealed a growing gap between demand and supply of local labour to fill skilled positions in the industry. The current workforce gap is between 31 to 37 percent of the region's high-tech industry cluster demand. The gap has been increasing since 1995 and is projected to grow to approximately 200,000 positions by the year 2010.[16] It should be noted for this study the workforce gap included commuters, outside recruits, and unfilled positions.

It may be that some skill requirements have kept pace with the rapid growth in the IT industry, but other skills may require upgrading.

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[14] Information Technology Association of Canada – IT Skills Shortage in Canada – A Snapshot. Prepared by Branham Group Inc. February, 1999.
[15] Information Technology Association of America – Executive Summary – Bridging the Gap: Information Technology Skills for a New Millenium. – http://www.itaa.org/workforce/studies/hw00execsum.htm
[16] Joint Venture's Workforce Study – An Analysis of the Workforce Gap in Silicon Valley – www.jointventure.org.

There are some indications that the supply of technical skills to the ICT sector has kept pace with demand. However, due to fluidity, pace of change and global scope of the ICT sector, it is extremely difficult to identify and gauge the impact of skill shortages on growth prospects. Some industry observers suggest that the skill picture in ICT is changing too quickly to be accurately captured by current labour market monitoring systems.[17]

One factor seen as inhibiting the uptake and use of IT and electronic commerce is the widely held idea that an IT worker shortage has developed. For the United States, the major IT market and supplier, data on unemployment rates, wages and graduates suggest that there is no conclusive evidence of a serious shortage of IT workers. However, the structure of available skills may be a concern, and governments are likely to need to foster acquisition of the necessary IT skills.[18]

2.4 Education, Certification, Professionalism

In 1997 the Information Technology Market Research report prepared for the Software Technology Centre identified a number of education issues in Saskatchewan. Some of the conclusions derived from the research were:

- Regardless of institute, the IT industry perceives the post-secondary training that students are receiving leaves them less than fully prepared and qualified for jobs in the IT industry.
- The IT industry perceives there is much room for improvement in working collaboratively and strategically together with government and post-secondary institutions.

While these two issues are identified as perceptions there is evidence of some skills deficiencies in the industry. In the report Stepping Up –Skills and Opportunities in the Knowledge Economy it was reported "In sharp contrast with the technical skills picture, but equally critical to the competitiveness success of Canadian industry, is a persistent shortage of people who combine strong technical abilities with essential skills (e.g. communications and teamwork) and management skills (e.g. cost control and budgeting)." In all five sectors, executives reported that finding technically competent people who can work in teams, communicate effectively and apply their technical knowledge to real world business problems, is a significant challenge.

In Newfoundland some of the conclusions reached after completing a study of their IT industry were:[19]

- the ever-changing face of the Information Technology industry requires that educational programs keep pace in response to those changes and demands;

[17] Stepping Up - Skills and Opportunities in the Knowledge Economy. Report of the Expert Panel on Skills. Advisory Council on Science and Technology.
[18] OECD Information Technology Outlook 2000: Highlights – http://www.oecd.org/dsti/sti/it/prod/IT2000Highlights_e.htm
[19] Information Technology – Closing the Human Resources Gap in Newfoundland and Labrador- Final Report May, 1998.

- the Information Technology industry needs to increase its visibility in the community and establish itself as a viable career choice for a growing number of our citizens;
- a skills gap exists between what students and employees in the Information Technology industry perceive and currently possess, and what Information Technology employers expect.

In the United States the Information Technology Association of America reported the IT skills required by employers change quickly with the following consequences:[20]

- changes in skill requirements will be a way of life for IT professionals;
- frequent training will be necessary to meet shifting needs for skills.
- corporations must reconcile themselves to the financial and organizational commitments implied by continuous shifts in skill requirements;
- industry, professional organizations, academia and government should recognize and support the trend toward lifelong learning.

The Canadian Information Processing Society (CIPS) is Canada's largest association of IT professionals representing some 8,500 members across the country. Certified members hold the Information Systems Professional of Canada (I.S.P.) designation. The I.S.P. is not government sanctioned licensing but is an assurance that the holder has attained the designated professional qualifications and has agreed to adhere to the CIPS Code of Ethic and Standards of Conduct. Currently CIPS is in the process of seeking legislative approval in Saskatchewan for self-regulation of the I.S.P. designation. Approval has already been granted in Alberta, British Columbia, and Ontario. It is anticipated that the I.S.P. will be recognized as a self-regulating designation in the province of New Brunswick since Legislation is awaiting Royal Assent.

The US-based Institute for Certification of Computing Professionals (ICCP) is an international not-for-profit organization that offers non-vendor specific certification examinations. The ICCP offers two levels of certification, the Certified Computer Professional (CCP) for experienced professionals and the Associate Computer Professionals (ACP) for entry level professionals. These designations are considered to be designations with international stature. CIPS is a founding member of the ICCP. The CCP certification along with 5 years of professional level experience is an entrance point (suitable for application) into the I.S.P.

CIPS has also established three Accreditation Councils, one for computer science and software engineering programs at Canadian universities, one for Management Information Systems (MIS) courses at Canadian universities, and one for information technology diploma courses at Canadian technical schools and colleges. In Saskatchewan the University of Saskatchewan, the University of Regina, and SIAST (Palliser and Kelsey campus) have received CIPS program accreditation.

The Canadian Technology Accreditation Board (CTAB) strives to promote excellence in technical education by furthering standards to certify individual technicians and technologists. In

[20] Information Technology Association of America – Task Force Reports www.itaa.org/workforce/studies/task.htm

Saskatchewan SIAST (Kelsey, Wascana, Palliser campus) have nationally accredited programs in a number of technology disciplines.

Throughout the industry there is little standardization regarding skills and responsibilities required by occupations within the industry. The Software Human Resource Council in co-operation with CIPS and representatives from the Canadian software and IT industry developed the Occupational Skills Profile Model (OSPM) to describe the skills and responsibilities associated with 24 occupational streams in the software industry. The information in the model is being used by Human Resource Development Canada (HRDC) in revising the National Occupation Classifications (NOC).

The OSPM breaks all software skills into 4 key groupings:

- technical and functional skills
- business and management skills
- personal and interpersonal skills
- software and IT environments (domain knowledge).

2.5 Conclusion

The IT industry is undergoing rapid and constant change. The rapid change and lack of standardization in the industry makes it difficult to accurately assess or state the skill shortages and needs in the industry. It does appear that skill shortages are a fact in the industry and are not unique to Canada. The needs of the American industry are likely to impact on the availability of IT workers in Canada.

In Saskatchewan there has been substantial growth in the number of IT companies over the last few years. While Canada will need to compete with the US for skilled IT workers, particularly at the higher education levels, Saskatchewan will need to compete with its neighbouring provinces.

The literature review has revealed a number of issues to be considered. The major issues are:

- are there sufficient qualified, experienced workers to meet the needs of industry;
- what occupations within industry need to receive priority in terms of recruitment and retention;
- are new entrants to the industry adequately trained;
- how does industry and education and training providers approach the need for ongoing training of employees;
- what role do education and training providers need to provide to meet the needs of industry;
- is compensation and turnover a problem for Saskatchewan IT companies;
- what role can CIPS provide to promote professionalism within the IT industry in Saskatchewan?

3.0 Education and Training Database

Research was conducted to develop and compile a database of education and training programs for the Saskatchewan information technology industry. The database outlines education and training programs that may be applicable to the Information Technology industry. The database includes programs offered across Saskatchewan and identifies the institution, program name, and contact information. The Education and Training Database is attached to this report as Appendix A. The results show that further research and development work is required before the database is useful and relevant. The Steering Committee has recognized the importance of this database as a resource and have plans to expand this in the next phase.

4.0 Human Resource and Training Needs Assessment Survey

In order to gain a broad understanding of the human resource and training issues in the provincial information technology industry, 190 companies were asked to participate in the survey, of which 25 were not interested or did not have any IT positions within their company. 165 companies in Saskatchewan were sent survey questionnaires related to these topic areas. Of these, 60 companies returned their completed surveys. The survey was conducted between August and December, 2000. Twenty-two surveys were obtained from Regina, 28 from Saskatoon, 3 from Yorkton, 1from each of Swift Current, Colonsay, Melville and Moose Jaw. Three respondents did not provide their addresses.

As the information received in the first survey was not sufficient for statistical purposes a second survey instrument was drafted by the Steering Committee together with the Trimension Group. This survey was administered to 284 companies by telephone and 2 by fax during the month of March, 2001. Sixty-three completed surveys were obtained from Regina, 131 from Saskatoon, 6 from Yorkton, 11 from Moose Jaw, 13 from Prince Albert, 8 from North Battleford, 3 from each of Canora, Esterhazy Melville, Estevan and Weyburn, 2 from each of Big River, Humboldt, and Canoe Narrows. An attempt was made using a random list of Saskatchewan companies, however, this was too broad of a group and qualified companies were few and far between. Specific organizations were then targeted, namely large corporations, crown corporations, government departments, computer/computer related companies, consulting companies, insurance agencies, engineering firms, accounting firms, law firms and airports, education and training providers, to name the main ones. When contacting potential participants in this target group, an average of 1 out of 8 agreed to participate. Those who didn't participate either had no time, had no Information Technology employees or were unwilling to participate. Based on the number of survey participants, the statistical data gives a ±5% confidence rate, 19 out of 20 times.

The following is the detailed report and analysis of the surveys. Attached as Appendix B are copies of the survey instruments.

Section One: Company Information

4.1 How many people in your company in Saskatchewan, (full time, part-time, contract) including yourself are considered to be in Information Technology (IT) positions. N=344

Position	Saskatoon	Regina	Other	TOTAL
Full-time	**1212**	**1080**	**489**	**2781**
# of companies with full-time positions	151	77	94	325
Part-time	**57**	**169**	**53**	**279**
# of companies with part-time positions	33	28	29	90
Contract	**70**	**333**	**27**	**430**
# of companies with contract positions	34	25	16	75
TOTAL IT Positions in the Company	**1339**	**1582**	**569**	**3490**
# of companies with Information Technology positions	156	85	103	344

Respondents were asked questions based on the statistics from the office location they were at and not all branch offices across Saskatchewan their company had.

4.2 How many employees do you have in each of the following positions and how many to you expect to employ within the next 1 - 2 years? N=286

Job Description	Current	In 2 Years
Programming/Software Development	616	544
Systems/Business Analysis & Design	306	243
Web-Based Application Development	183	182
Computer Support & Network Administration	510	380
Administrative Support	201	165
Database Administrators	126	102
Multi-Task Resource Person	252	262
Other	43	109
TOTAL	2237	1987

Our data shows an increase of 66 positions in the "other" category. It was found that 65 of the 109 "other" positions were sales related. The "other" responses include:

- Don't know
- Accounting and income tax
- Audio-Visual People
- Because we use contract employees, they come in and do a variety of information technology tasks for us. They work on a commission basis.
- Break Fix – repair
- Geographic Information Systems
- Drafting
- I have an employee who comes in at busy times, or when I'm away.
- Information systems
- One person is teaching programs.
- Senior Consultant
- Server equipment

The recent downturn in the market of the tech stocks has possibly caused companies to reconsider the growth of Information Technology positions within their company for the time being. As markets rebound this will create a demand again. Despite the downturn, a growth is expected in the multi-task resource occupation and for sales positions, which is reflective of the situation when the market is low.

The following section identifies employment projections for the first 60 companies surveyed. This information was not easily transferred into the first part of this section, and therefore has been put in as a separate section. The Software Human Resource Council in co-operation with CIPS and representatives from industry developed the Occupational Skills Profile Model (OSPM) to reflect software work in the marketplace. This Profile Model was used in the first survey.

Please indicate which of the following IT occupations your company currently employs. If an employee has more than one occupation please assign the occupation for which the employee spends the most time. N=60

This question requested employers to identify the number of IT occupations their company currently employs by employment category. They were then asked to identify their total current positions. **The totals for these two questions do not add up, possibly due to the fact that some employers chose more than one category of work for a single employee.** For each of the following occupation categories, employers project an increase in the number of full time positions: Informatics Business 107.2%, Informatic technical 54.7%, Informatics Evaluation 35.9%, Informatics Integrity 35%, Informatics Operations 6.7%, and Informatics Data 47.7%. Those positions listed in this category include Web developers, GIS developers, statisticians, data processing, support staff, graphic design and IT marketing/Sales.

Employed by Company	Currently Employ			In 5 Years		
Category	Full-Time	Part-Time	Contract	Full-Time	Part-Time	Contract
Informatics Technical						
Software design & delivery	73.5	6	14.5	133.5	8	11
Analysis design	58	2	3	72	3	7
Analysis programming	101	4	8	132	2	10
Programming	101.5	2	10.5	165.5	9	27
Total	338	14	38	523	22	57

Employed by Company	Currently Employ			In 5 Years		
Category	Full-Time	Part-Time	Contract	Full-Time	Part-Time	Contract
Informatics Evaluation						
Business analysis & Service level management	47	4	1	56	3	2
Capacity & performance	8	1	1	13	0	1
Technical architecture	36	3	1	53	0	2
Total	92	8	3	125	3	6

Employed by Company	Currently Employ			In 5 Years		
Category	**Full Time**	**Part Time**	**Contract**	**Full Time**	**Part Time**	**Contract**
Informatics Business						
Informatics management	29	2	0	29	2	0
Informatics consultancy	13	0	0	26.33	1	0
Problem management	19.5	1	3	31.33	1	2
Project management	43.5	2	2	75.33	3	1
Total	111.0	5	5	229.0	7	3

Employed by Company	Currently Employ			In 5 Years		
Category	**Full Time**	**Part Time**	**Contract**	**Full Time**	**Part Time**	**Contract**
Informatics Operations						
Operations routine	25.33	2	1	18.33	1	2
Systems programming	19.33	2	5	26.33	5	4
Audit	1.33	0	3	2.33	1	3
Total	45	4	9	48	7	9

Employed by Company	Currently Employ			In 5 Years		
Category	**Full Time**	**Part Time**	**Contract**	**Full Time**	**Part Time**	**Contract**
Informatics Integrity						
Network support	57.33	3	8	73.33	2	5
User/technical support	50.33	2	4	64.33	3	4
Help desk	27.33	4	2	37.33	2	4
Security	7	0	2	11	2	4
Quality assurance	13	1	3	14	1	3
Testing	20	1	1	27	1	3

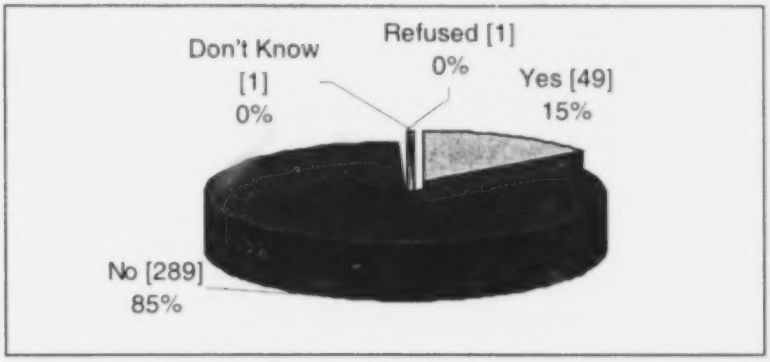
Employed by Company	Currently Employ			In 5 Years		
Category	**Full Time**	**Part Time**	**Contract**	**Full Time**	**Part Time**	**Contract**
Informatics Data						
Data administration	12.5	3	1.5	17.5	2.5	1
Database administration	27.5	5	2.5	43.5	1.5	1
Total	44	7	4	65	4	2

Employed by Company	Currently Employ			In 5 Years		
Category	**Full Time**	**Part Time**	**Contract**	**Full Time**	**Part Time**	**Contract**
Informatics Education						
Education/training	12	5	2.5	12	5	6
Technical writing	8	2	.5	6	4	2
Total	20	7	3	20	7	8

Employed by Company	Currently Employ			In 5 Years		
Category	**Full Time**	**Part Time**	**Contract**	**Full Time**	**Part Time**	**Contract**
Other – List	82	7	5	20	1	5
Total	82	7	5	40	3	8

See Appendix C for a list of job descriptions developed by the Software Human Resources Council.

4.3 Are there any Information Technology positions in your company currently vacant? N=340



Total number of positions vacant = 263

Fifty companies indicated that they currently have vacant IT positions (n=340). Some of the positions include: programming, software development, network engineers, Web-based application development, computer support and business analysis and design. These positions have been open for an average of 3.7 months. The length of time these positions were vacant ranged from 1 to 18 months. Of those companies who do have vacancies (49), 21 are from Regina, 18 are from Saskatoon and 10 are from other places in Saskatchewan. Of those who do not have vacancies (289), 65 are from Regina, 133 from Saskatoon, and 91 from other places in Saskatchewan. See Appendix D, Section 4.3 for a complete list of participant answers.

4.4 The following is a list of difficulties or problems employers may face trying to recruit employees. From your experience, when looking for Information Technology workers, do you find that:

Difficulty/Problem	Yes	No	Refused	Don't Know
There is a lack of applicants with the required education. N=332	30%	55%	8%	7%
It is difficult to offer competitive wages. N=330	43%	44%	6%	7%
There is a lack of applicants with relevant experience. N=333	67%	20%	6%	7%
There is a lack of applicants with required skills. N=332	59%	29%	6%	6%
Other employers offer better locations/incentives/benefits (these could include Medical/dental/disability/life insurance; bonuses; retirement benefits; financial training assistance; profit sharing; stock options; sick leave; on-the-job training)? N=329	42%	44%	6%	8%

Of the reasons listed on the survey, the respondents indicated that the major difficulties in recruiting IT employees are: a lack of applicants with relevant experience (67%), a lack of applicants with required skills (59%) and offering competitive wages (43%), followed closely by other employers offer better locations/incentives/benefits (42%).

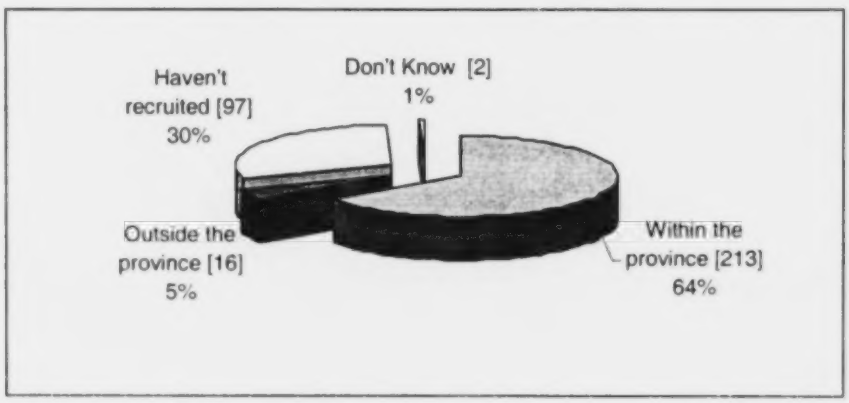
4.5 Do you experience any other recruitment difficulties?

There were a variety of recruitment difficulties experienced by participants. The three most common were:

1. Location. The ability to attract skilled employees to a geographically isolated area such as Saskatchewan. Location is key. People do not want to live in rural Saskatchewan or Saskatchewan in general.
2. Salary. Salary expectations are very high for the experience industry people have.
3. Training. New recruits need more experience with hands on skills and training, as well as on-the-job training. The perception of some of the respondents is that training is not available in Saskatchewan.

See Appendix D, Section 4.5 for a complete list of participant comments.

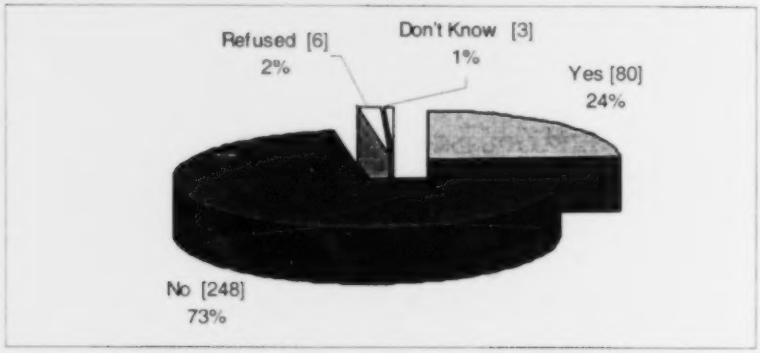
4.6 In the last year, where have the majority of your Information Technology employees been recruited from? N=328



In the last year, 64% of IT employees working for the companies surveyed were recruited from within the province. Only 5% were recruited from outside the province and 30% of companies surveyed haven't recruited in the last year. Three percent (10) of the respondents declined to answer this question, while the remaining 1% (2), they did not know from where the majority of their employees were recruited.

Section Two: Recruitment and Retention

4.7 Is employee retention among Information Technology employees in your organization an issue? N=337



Employee retention among Information Technology employees does not appear to be an issue for the companies surveyed, as indicated by 73% of respondents. No definition of "issue" was provided to respondents when asked this question. The companies who indicated that employee retention was an issue in their organization are primarily organizations whose primary business is not Information Technology. No one particular sector of the industry is dominant.

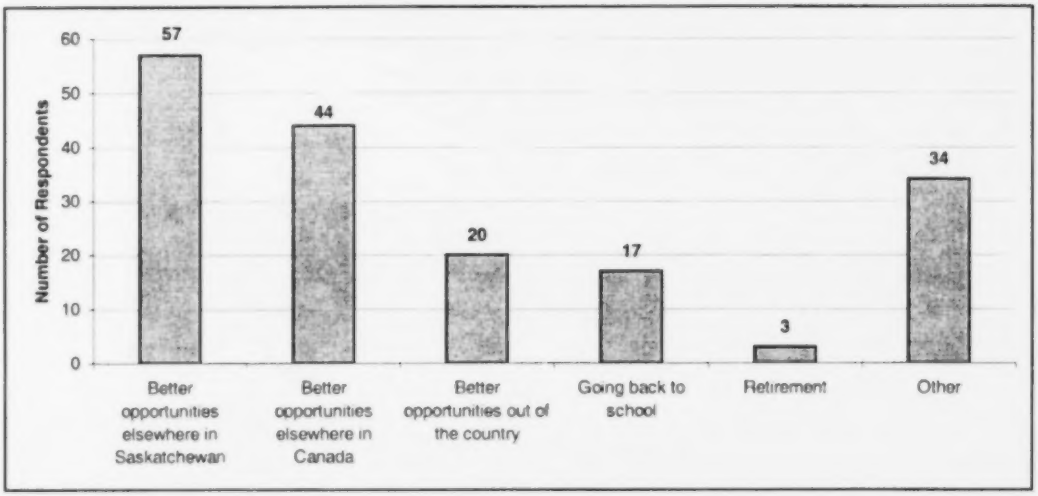
4.8 In the last year, how many Information Technology employees left your company for one of the following reasons: N=148

Reason	How Many Employees
Left voluntarily	265
Were terminated	82
Were laid off	29
Internal Transfer	20
Retired	10
Other *(specify)*	8

Four participants refused to answer this question. Those "other" participant answers include:

- Contract (2)
- Death (2)
- Don't know break down.
- Offered more money elsewhere.
- Personal reasons.
- The student I had went back to school.

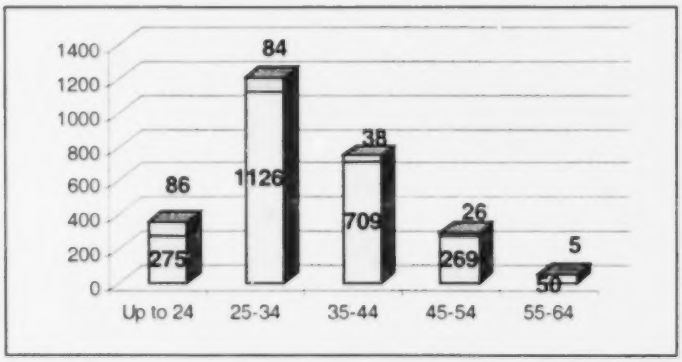
4.9 Of those who left voluntarily, what are the most common reasons given for why they left? (Check all that apply.) N=138



Note: Because companies could check more than one reason, the totals do not equal the number of companies who responded.

Of those companies that indicated employees left their company voluntarily, the main reasons for the voluntary departure were: better opportunities elsewhere in Saskatchewan (42.5%), better opportunities elsewhere in Canada (32.8%) and other (22.4%). Five participants refused to answer this question. The three most common "other" category responses are: looking for a new challenge in the field, maternity leave and spouse transferred. See Appendix D, Section 4.9 for a complete list of participant comments.

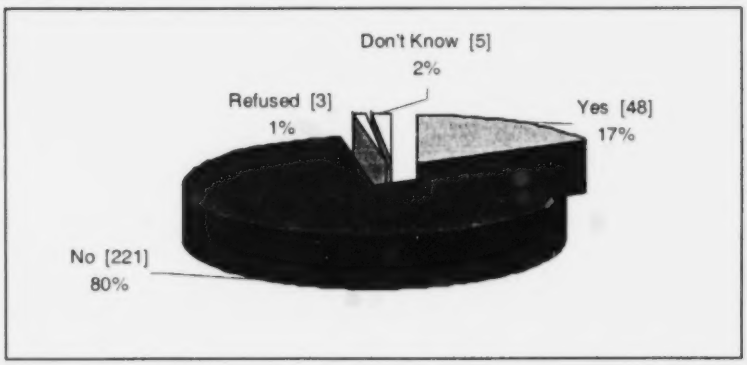
4.10 How many of your Information Technology employees are in the following age categories? N=330



Of the companies who responded to this question (330), they employ 2668 full and part time IT workers. The majority of full time employees are between the ages of 25 and 34 (46.3%) and the

majority of part time employees are under 24 years of age (36%). The second highest number of full time employees are between the ages of 35-44 (29.2%), while part time employees are between the ages of 25-34 (35.1%). In full time positions, the third largest group are those Under 24 (11.3%), while for part time positions, the third largest group are those between the ages of 35-44 (15.9%). Only 2% of full time and part time employees are between the ages of 55-64. Similarly, there are no employees, in both full and part time positions aged 65 or over.

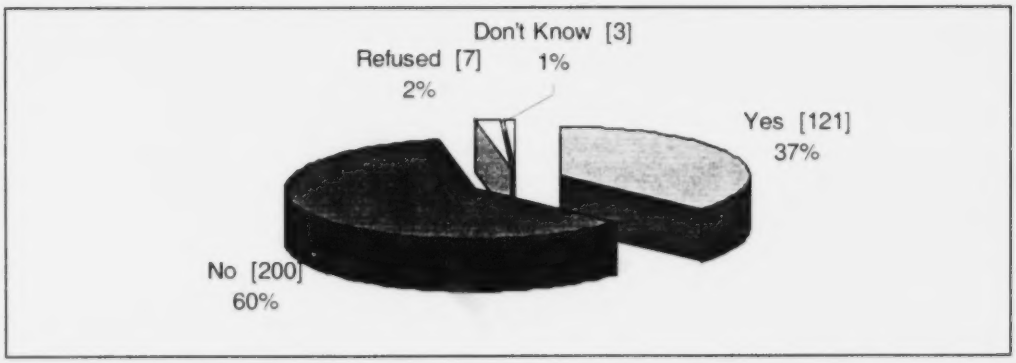
4.11 Is your long-term business growth being compromised because of a lack of a skilled labour force? N=277



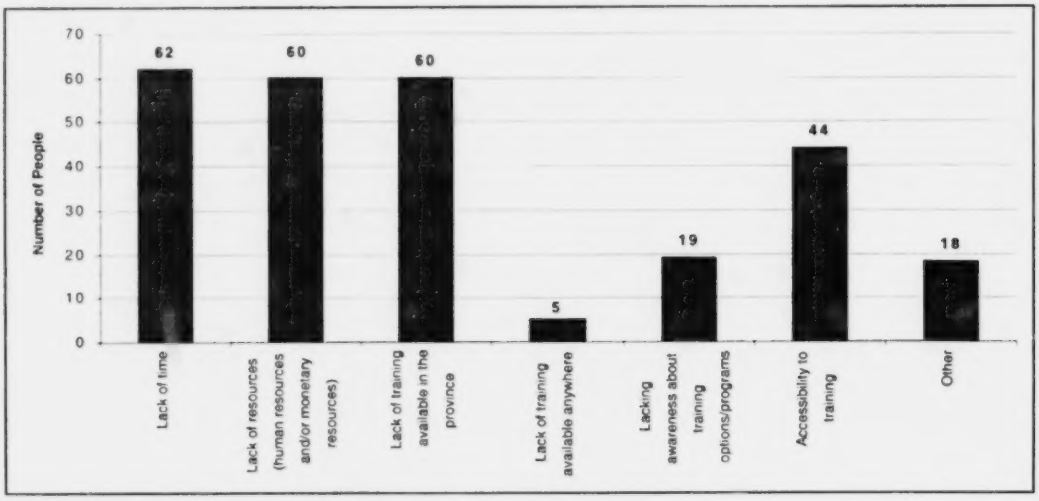
The first survey (60) results did not contain this question, therefore, are not reflected in the results of this question. Of those companies whose long term business growth is being compromised by a lack of a skilled labour force (48), 27 view employee retention as an issue and 21 do not. Those companies whose business growth is not being compromised (221) show that 42 of them view employee retention as an issue, whereas 173 don't.

Section Three: Skill Requirements & Training

4.12 Do you have any difficulties providing your employees with the opportunity for ongoing training? N=331

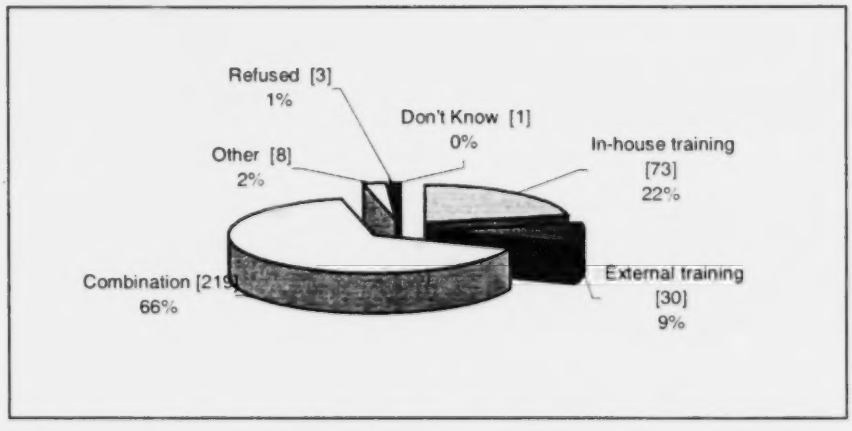


4.13 Why? (Please check off those that apply) N=120



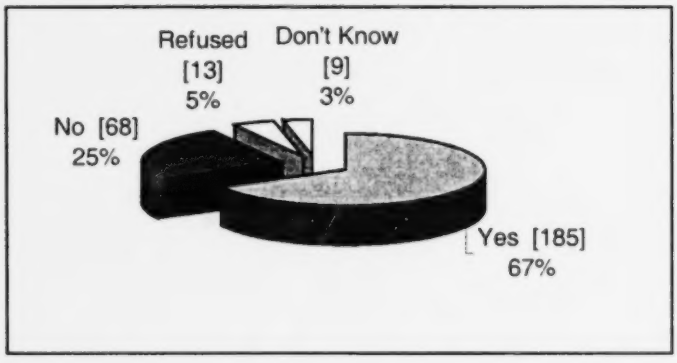
Thirty-seven percent of the companies surveyed (n=331) agreed that they had difficulties providing their employees with the opportunity for ongoing training. Sixty percent (60%) of the respondents do not have difficulties providing ongoing training. The companies were able to choose more than one answer. The top three major difficulties in achieving training objectives were indicated by the respondents to be: 1) lack of time (51.6%), 2) the lack of training available in the province (50%), and 3) a lack of resources (human resources and/or monetary resources) (50%). Those "other" category responses include: rural companies have too far to go to get to training centers, training specialized to each individual company's needs is not available and once people are trained they leave the company for something better. See Appendix D, Section 4.13 for a complete list of participant comments.

4.14 What is the best way to provide Information Technology employees with the ongoing skills required for the industry? N=334



In-house training (by own staff; on-the-job training), External training (bring in instructor or let employees go out for training) and Combination of In-house and External training were options for this question. Of the companies who responded to this question (n=334), 66% had the opinion that the combination of In-house and External training is the best way to provide IT employees with the ongoing skills they, and the business require. This is followed by In-house training (22%) and External training (9%). The most common "other" responses include: Information training (internal), on line training and new recruitment.

4.15 Do existing education and training programs offered in Saskatchewan meet your company's hiring needs? N=275



The first survey (60) results did not contain this question, therefore, are not reflected in the results of this question. This is consistent with the percentage of companies who hire from within the province. Of those companies who indicate that education and training programs offered in Saskatchewan meet their company's hiring needs (185), 119 of them recruit from within the province, while 5 recruit from outside the province and 60 haven't recruited in the last year. Those who indicate the education and training in Saskatchewan do not meet their hiring needs (68), 44 of them recruit from within Saskatchewan, 9 from outside of Saskatchewan and 15 haven't recruited anyone in the last year.

A brief review of the 1997 Labour Market Information Strategic Initiative Project (Sector Studies) shows that approximately 55% of the companies surveyed believed that Saskatchewan's education and training programs met their company's needs. When compared to this study, an increase of 12% indicates a positive trend.

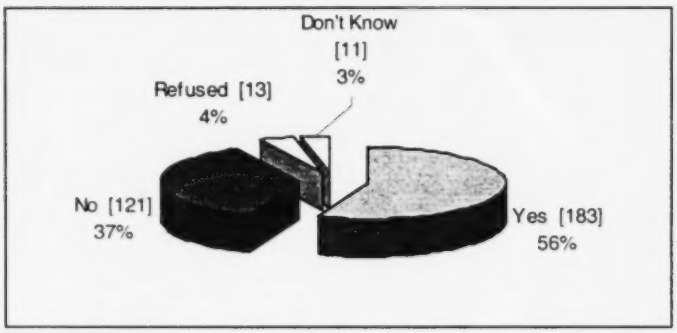
4.16 Why not? N=68

The first survey (60) results did not contain this question, therefore, are not reflected in the results of this question. Of the 68 respondents who answered this question, the reasons given for why education and training programs offered in Saskatchewan do not meet their company's hiring needs include:

- There is not enough high level training available in Saskatchewan;
- There is not enough hands on training;
- The industry is changing so fast that the schools are unable to keep up with the current software training;
- More specific training is required;
- Certification is required;
- Applicants do not have the necessary skills they are seeking.

See Appendix D, Section 4.16 for a complete list of participant responses.

4.17 Do existing education and training programs offered in Saskatchewan meet your company's ongoing training needs for existing employees? N=328



Of the companies who answered this question, 56% believe that their company's training needs are being met in Saskatchewan. Thirty-seven percent (37%) do not believe their company's training needs are being met.

4.18 Why not? N=121

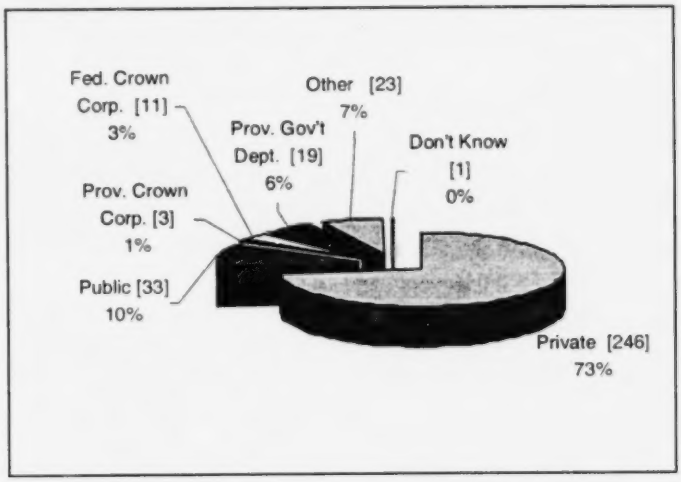
Of those companies who did not believe training needs were being met, the top three reasons include:

- specific training is not available in Saskatchewan – you must travel to other provinces or countries for the required training;
- companies indicate they received training through vendors because the vendor could provide product specific training; and
- Saskatchewan provides good basic training for the industry.

See Appendix D, Section 4.18 for a complete list of participant comments.

Section Four: Demographics

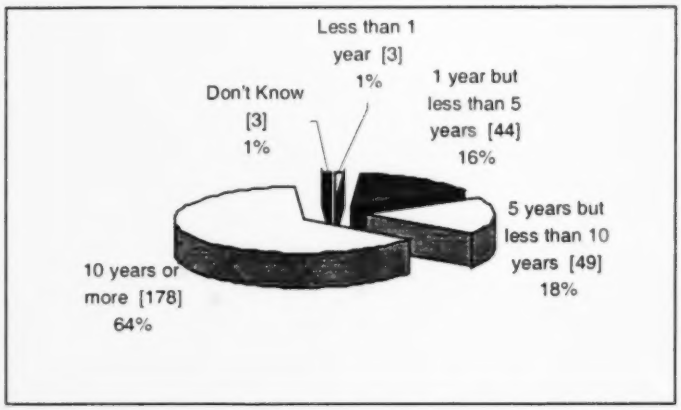
4.19 Is your business? N=336



Those falling into the "other" category include:

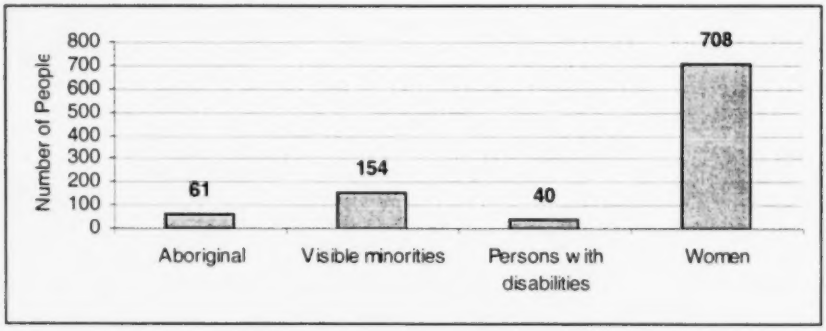
- Co-operative (4)
- Non-profit organization (3)
- Municipal Government (3)
- Federal agency.
- Human Resources - Canada
- Incorporated Company with the Co-operators
- Incorporated under the provincial government.
- It is owned by three different companies.
- Limited Company
- Local company
- Part of a public company.
- Private provincial corporation
- Provincial education facility
- Similar to the Motor Club.
- Statutory Corporation.

4.20 How long has your company been in business in Saskatchewan? N=277



The first survey (60) results did not contain this question, therefore, are not reflected in the results of this question.

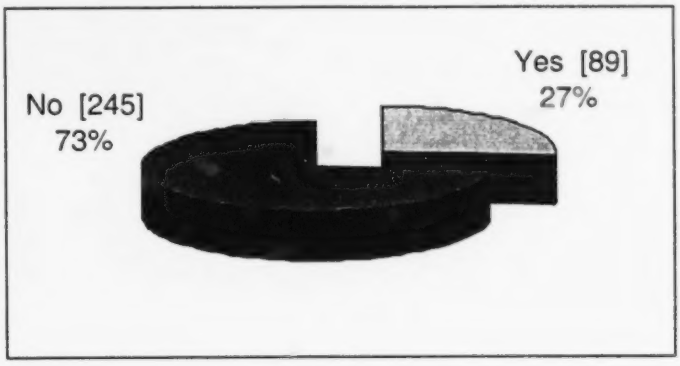
4.21 How many Information Technology employees do you have in each of the following groups? N=346



There is a possibility that an employee appears in more than one category. Based on the survey results, 1.75% of the Information Technology workforce are aboriginal, 1.2% are persons with disabilities, 4.4% are visible minority persons, and approximately 20% are women.

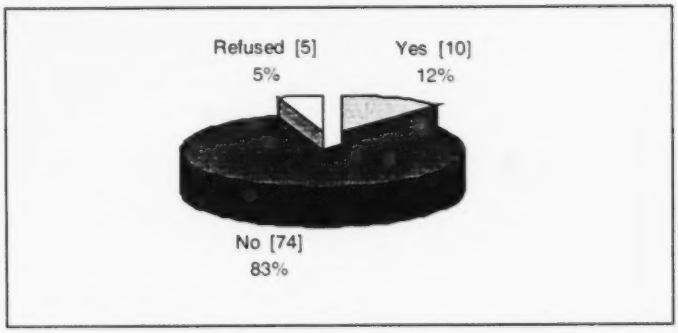
Section Five: Certification and Professionalism

4.22 Are you familiar with the CIPS Information Systems Professional (I.S.P.) designation? N=334

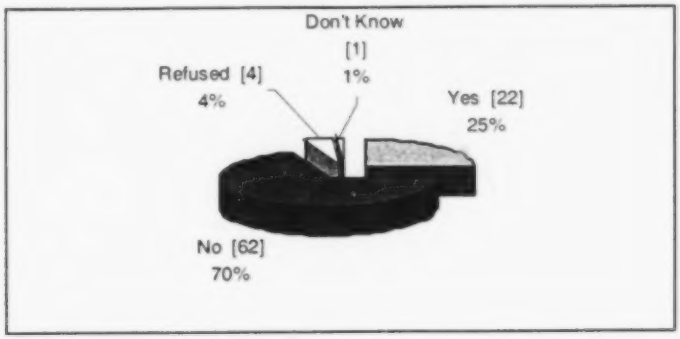


Of those who are familiar with the CIPS Information Systems Professional designation (89), 37 of those companies are from Regina, 37 from Saskatoon and 15 from the rest of Saskatchewan. The majority (68) of these companies have less than 20 Information Technology employees. Of those who are not familiar with CIPS designation (245), 48 are from Regina, 117 from Saskatoon and 80 from the rest of Saskatchewan. As well, the majority (226) of these companies have less than 20 Information Technology employees.

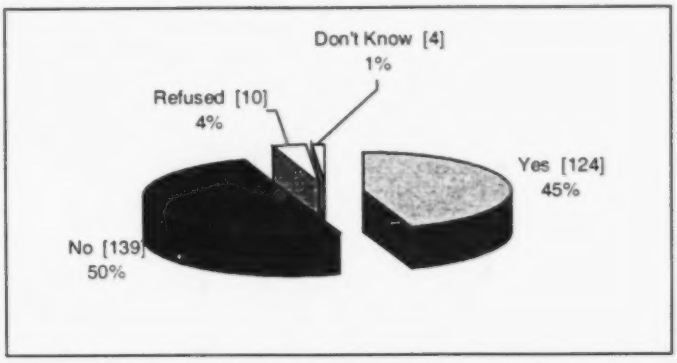
4.23 Do you look for the I.S.P. designation when recruiting new Information Technology employees? N=89



4.24 Do you encourage Information Technology employees to obtain the I.S.P. designation? N=89

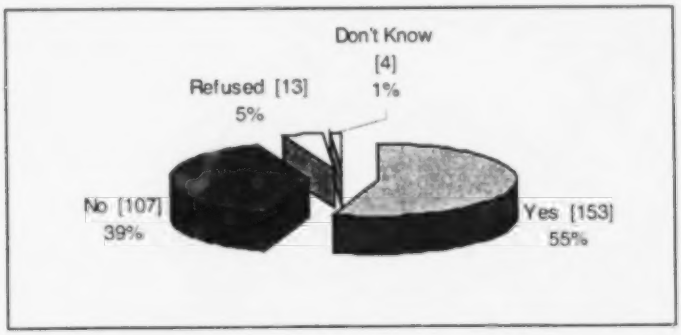


4.25 Do you look for any other type of certification (such as A+ Certification; Microsoft Certification) when recruiting new Information Technology employees? N=277



The first survey (60) results did not contain this question, therefore, are not reflected in the results of this question.

4.26 Do you encourage Information Technology employees to obtain any other type of certification (such as A+ Certification; Microsoft Certification)? N=277



The first survey (60) results did not contain this question, therefore, are not reflected in the results of this question.

5.0 Industry Validation

The objective of focus groups is to validate and obtain, in greater detail, input into the key issues that were raised during the surveys. The goal of the focus group is not to gain consensus in the group, but rather to hear from everyone.

Participants were recruited from those companies that were surveyed. In some situations, the person that was interviewed attended and in other cases they sent someone on behalf of their company. Focus group participants were recruited during the week of April 2 to 6, 2001. Participants were randomly selected from those who agreed during the survey to participate in a follow-up focus group session. A focus group was held in Saskatoon and in Regina. Thirteen participants were recruited for the Saskatoon Focus Group and 11 for the Regina Focus Group. Confirmation calls were made one or two days prior to the focus group dates. The Saskatoon Focus Group session had 8 participants and the Regina Focus Group session had 8 participants. The focus groups were held in Saskatoon and Regina on April 10 and 11, 2001, respectively.

Focus Group participants were advised that prior to conducting the focus group, Trimension Group conducted 346 surveys to gather information from Saskatchewan employers in the information technology sector, as well as those businesses or organizations who employ IT workers in order for them to conduct their work.

5.1 Skill Requirements for the Information Technology Industry

The majority of the survey respondents indicated they faced difficulties in being able to provide their employees with the opportunity for on-going training. A number of reasons were cited including, lack of time and resources, lack of available training and accessibility to training.

Focus group participants were asked if this was the case and if the reasons given were accurate. Participants confirmed that the lack of time and resources, the lack of available training and accessibility to training are the main reasons employers face difficulties in being able to provide their employees with the opportunity for on-going training. In the opinion of the participants, the cost of training is a big issue. They believe that setting aside the issue of cost, if you can afford to send your employees for training, the training is not available anywhere. Participants felt training that is available is old, new materials were needed and that there didn't seem to be any programs available to target the end user.

Participants were then asked what they were doing to try to keep their employees skilled through on-going training. Some participants indicated they were using a mentorship type of system to train their employees in house as the time and resources for training were not available to companies. Participants agree that there is some transferability from one job to the next that helps in some cases. However, they felt the productivity level was not there because of the learning curve for each employee. They indicate that most of the on-going training is on-the-job. As well, they indicate that training also takes place when clients ask for products that companies have never delivered. They feel the cost of the training that takes place on that job is absorbed by the employer. Some employers are having expert consultants come in to work with specific

people on specific jobs and therefore, their employees are being trained while a job or project is being completed.

Some participants indicated that a bonafide developer conference in the Information Technology industry would be beneficial. At these conferences, employees have the opportunity to meet and talk with individuals who are at the appropriate technical level for the particular problems being experienced in their company. Participants felt that it should be noted that these conferences must be timely as the Information Technology industry rapidly changes. Participants were concerned that the educational organizations companies look to for leading edge technology are typically not on the leading edge of technology themselves, however, are not far behind. Sometimes, therefore, participants felt that these educational organizations are not able to deliver or provide the leading edge technology companies are looking for.

The survey respondents identified a number of ways they saw as the best to provide their IT employees with the ongoing skills required for their business or operation. The majority identified in-house on the job type of training as the best way.

Participants were asked if they agreed that this was the best way to provide employees with ongoing skills required for their business or operation. Focus group participants identified that in-house or on-the-job type of training is the only way they can afford or access training for their employees. Participants indicated that a lot of employees tend to leave for other provinces or countries once they have received the appropriate specialized training. In the opinion of the participants, this costs employers lots of money. Therefore, they tend to find the cheapest way to train or keep employees trained.

Participants were asked if they were using this method of training and whether or not it was working for them. Their responses were:

- "Companies are able to use their own tools and retrain in their own environment."
- "The cost is considerably less than it would be to send employees out for training."
- "In-house training provides the opportunity for employees to learn many different areas. Employees who are sent out for training return with only about 50% of the course content being relevant or useful to them."

When asked what other ways they use or think would be ways to provide ongoing skill development for their employees, participants suggested to model training after some of the other sectors. For example, law, medicine or engineering. Participants felt that a period of study was necessary, however, at some point the student needed to begin to specialize in an area. They felt an apprenticeship style program would be another possibility to provide the necessary skill training as well as the experience.

Some employers indicated they have begun to develop their own resource library and encourage their employees to obtain assistance or answers to questions through those resources.

Participants indicated that the individuals they have working today are doing more than they have ever done before. They feel there is no slack time within their company now that will enable them to provide time for training.

Other participants felt that more incentives for summer student programs and co-op programs would assist in providing these up and coming employees with some of the necessary hands on experience that employers are looking for when they hire new recruits.

When questioned as to whether or not there was a commitment by employers to ongoing training in the industry, the majority of participants felt there was not. They indicated that companies are hard pressed for time and money. Some participants felt it was more economical to hire those individuals who already possess the necessary experience as opposed to training new recruits. They indicated it all comes down to the dollar amount the individual will cost the company. Participants believe there is not a standard industry practice for the provision of entry level training or for ongoing training in the Information Technology industry.

Participants were asked how that commitment could be made or expanded. Some of their responses included:

- "There is a strong feeling that a more positive business climate needs to be developed in this province so industry will begin to build upon the training aspect."
- "It is imperative that Saskatchewan graduates be encouraged and provided with the opportunity to stay in Saskatchewan. That is where the value is. In order to do that, the province and business must create an environment that is more positive, which will also foster growth. If growth is fostered, eventually shortages will be experienced, creating a demand in the industry. Companies will then need to look at hiring new recruits as well as providing ongoing training for their existing employees."

There are a number of education and training programs and courses available in Saskatchewan that are offered by both public institutions and private trainers.

Participants were questioned as to whether or not the existing education and training programs met their company's hiring needs. Focus group participants felt that the education and training programs and courses available in Saskatchewan offered by both public institutions and private trainers did not meet their company's hiring needs. At the University level, it was felt there was not enough time spent on design work and too much focus on technical solutions. Although they felt that students coming out of a training institution are not in a marketable position, it was acknowledged that this problem exists across all industries, not just Information Technology. It was also stated that the broad base of knowledge is becoming a broad base of particular products. They felt graduates lack the ability to envision the whole project and don't often understand the impact their piece of the work project has on the end results.

Participants were also asked if the existing education and training programs met their ongoing training needs for existing employees. They felt existing programs and courses available do not meet their ongoing training needs. Participants indicated that if they want their employees to

have further training, they are forced to send them out of province, and in some cases out of the country. In the opinion of the participants, the existing programs are the kinds of courses end users can take to gain a limited perspective on how their systems work, they are not designed or suitable for technical staff and there is not enough focus on the technical aspects.

5.2 Recruitment and Retention

Participants were asked if retention of skilled employees was an issue for their company or the industry and why they don't stay. All participants indicated that they had difficulty in retaining skilled employees. They believe Saskatchewan companies are not able to retain their skilled employees because:

- They are unable or unwilling to pay these employees the salaries other provinces pay;
- There does not seem to be a tie to Saskatchewan for most of them;
- They believe Saskatchewan does not have anything to offer and therefore potential employees look elsewhere after having obtained the relevant experience and training they require to go to other provinces;
- Saskatchewan has a lot of smaller companies who require generalized Information Technology employees;
- Individuals working in this industry wish to specialize in one thing or another and small companies cannot offer that opportunity for them.

When asked where Saskatchewan is loosing the majority of Information Technology employees to, participants indicated mainly Alberta, with a limited amount to the United States and to Ontario. Participants feel there is a false perception that because Alberta (or other places) has lower taxes and higher wages, they will make more money. However, employees do not consider that the cost of living is also higher in these places.

Is long term business growth being compromised because of a lack of a skilled workforce for your business? For the industry as a whole? Why? Participants indicated that opportunities for the growth of businesses is not necessarily contingent on the fact that there is a lack of skilled workers. They felt it was more compromised by the business environment. They believe Saskatchewan does not have a good business environment. When they don't believe they can risk the chance, they are not willing to hire somebody to help them grow.

Recruitment of IT employees was seen by many employers as being difficult. This difficulty is the same for replacing employees who have left and new employees due to growth.

Participants were asked of there was a growing shortage of Information Technology workers for their company and for the industry. They believe there is a growing shortage of Information Technology workers in Saskatchewan. However, if there is a shortage, which is usually only short term, they believe it is not created because the businesses are growing in Saskatchewan. They feel any shortage experienced is as a result of people leaving for other opportunities out of the province.

Participants were then asked if vacancies were a common occurrence, how long it took to fill a vacancy, and some of the reasons why recruiting was difficult. Employers indicated they are experiencing some vacancies in their companies, that the vacancies last for a lengthy period of time because it is difficult for employers to find a qualified applicant to fill the vacancy and it is very difficult to attract people from out of the province to Saskatchewan. However, some employers did indicate that they have recruited from abroad from such places as the Ukraine, China and Pakistan.

Participants were asked to identify ways to overcome these difficulties. Their suggestions included:

- "It would be useful to have a committee of people from the industry in place to deal with the market place and the demands that it presents."
- "A better mechanism of doing a needs assessment and getting the needs clearly defined and passed on to the appropriate deliverers including industry themselves."
- "New technologies have to be examined and updated constantly."
- "There is a certain amount of elasticity within the industry for existing workforce to compensate for some of that new technology."
- "Government should not be a part of this initiative."

Participants believe that Information Technology has not been clearly defined to the public. Information Technology is the way of the future, however the jobs in Information Technology have been under advertised and the general public has a misunderstanding of the responsibility and workload that goes with them.

Participants suggested that a governing body be set up for registration of Information Technology graduates. This body would categorize each person with the appropriate specialization. In turn, this would allow employers to know who has what skills, instead of employers having to go through hundreds of resumes to find five qualified or skilled potential employees.

5.3 Accreditation

Participants were asked if worker accreditation was an important attribute they looked for when recruiting. For the most part, participants indicated they do not require their employees to have any type of accreditation. However, some encourage accreditation in different areas as a form of continuous learning. They don't, necessarily, place any value on it, other than it provides an opportunity for learning. Having said that, participants indicated they would never discourage an employee from obtaining accreditation.

Participants felt that vendors place a lot of weight on accreditation. For example, if a company wants to sell or fix Hewitt Packard products, those selling or fixing them must be A+ certified or Hewitt Packard will not allow the company to sell their products or support the company fixing their products.

5.4 Conclusion

Overall, the feedback gathered from the focus groups correlated well with the findings of the survey. Participants were able to elaborate a little more on key areas thus providing valuable subjective commentary. Based on the commentary, the information technology industry in Saskatchewan is basically holding its own and is not expecting or predicting any major growth or plans to make any changes to their practices for recruitment and retention.

6.0 Key Findings

Key findings gathered from the research provide an overview of the industry and summarizes the results of the human resource and training needs of the Information Technology industry organizations. The key findings from the Literature Review and the Needs Assessment study are as follows:

6.1 Literature Review

The Literature Review is consistent of a review of various reports that have been published both provincially and nationally on the Information Technology Sector.

Components of the Information Technology Sector

- The sector is divided into two main components: manufacturing and service.
- In Saskatchewan it is estimated that there are 247 Information Technology companies employing over 10,000 people.
- There are an undetermined number of companies who have IT departments and/or employees performing support to the main core of the business.
- Previous studies in Saskatchewan indicate there were shortages of graduates and qualified graduates.
- The IT industry in Saskatchewan has been one of the fastest growing sectors in the provincial economy over the past number of years.

Education and Certification

- There is a perception within the industry that post-secondary education and training does not fully prepare students for jobs in the industry.
- The Canadian Information Processing Society (CIPS) is the largest Canadian association that represents Information Technology professionals. CIPS has developed the Information Systems Professional (I.S.P.) designation.
- The Software Human Resource Council (SHRC) in co-operation with CIPS and the industry developed the Occupational Skills Profile Model (OSPM) to describe the skills and responsibilities associated with 24 occupational streams in the software industry.

6.2 Needs Assessment

The following summarizes the key results from the telephone survey and the focus groups.

Employment Trends

- Fifty companies indicated they currently have vacant IT positions. These occur in the areas of programming, software development, network engineers, web-based application development, computer support and business analysis and design.
- Respondents indicated the major difficulties in recruiting IT employees are the lack of applicants with relevant experience, a lack of applicants with required skills, and the inability to offer competitive wages.
- The three most common difficulties experienced by the industry in recruiting is location, salary and training.

- Companies that were surveyed still recruit the majority of their employees from within the province.
- Due to the economic downturn in the high tech sector there has been a softening in the employment growth projections. In spite of this, there appears to be opportunities of growth as multi-task resource persons and sales personnel. These two occupations reflect a shift away from the more technical/programming type positions.

Recruitment and Retention

- Employee retention does not appear to be an issue for the majority of companies surveyed.
- Those companies who stated retention was an issue in their organization were mainly businesses and organizations that employ IT workers to support their operation, not IT companies.
- The main reason given as to why employees leave a company is voluntary leave.
- Of those who leave voluntarily, better opportunities elsewhere in Saskatchewan was the main reason given.
- The 25-34 age group has, by far, the most number of full-time and part-time employees.
- By and large, the lack of a skilled workforce is not compromising business growth of the companies that were surveyed in the Information Technology industry.
- Employers tend to recruit the majority of their employees from within the province.

Skill Requirements and Training

- Just over one-third of the companies surveyed indicated having difficulties in providing ongoing training to their employees.
- The three most common reasons for this difficulty were lack of time, lack of resources (both human and/or monetary) and lack of training available in the province.
- A combination of in-house and external training was identified as the best way to provide employees with ongoing skill development.
- Over two-thirds (67%) of the companies surveyed indicated the education and training programs offered in Saskatchewan meet their hiring needs.
- Fifty-six percent (56%) of the companies surveyed indicated that existing education and training programs offered in Saskatchewan meet their ongoing training needs for existing employees.

Equity Participation

- Of the companies surveyed, men predominantly occupy Information Technology positions.
- Based on the survey results, 1.75% of the Information Technology workforce are aboriginal, 1.2% are persons with disabilities, 4.4% are visible minority persons, and approximately 20% are women.
- The industry is under represented in all categories, other than men, against the provincial workforce participation average.

Certification and Professionalism

- Almost 75% of those surveyed were not familiar with the CIPS I.S.P. designation.
- Over 80% of those companies surveyed do not seek I.S.P. designation when recruiting.
- Forty-five percent (45%) of those who responded look for other types of certification when recruiting new employees.
- Fifty-five percent (55%) of those same respondents encourage employees to obtain other types of certification.

7.0 Recommendations

The following recommendations were developed by the Steering Committee. Implementation of these recommendations will be the responsibility of the Steering Committee in partnership with their stakeholders.

1. The Steering Committee investigate the possibility of establishing a permanent body to implement and co-ordinate the needs identified in this study.

Strategies

- **Develop a mechanism to bring industry and stakeholders together to discuss common issues and needs.**
- **Develop ways to co-ordinate the training that is needed by industry so training is more accessible and affordable through sharing costs.**

2. The Steering Committee review its membership to enhance the representation on the Steering Committee.

Strategies

- **Identify potential new members on the Steering Committee.**
- **Saskatchewan Advanced Technology Association (SATA) be approached to become a partner.**

3. Develop a communication strategy to promote the results of this study and the on-going work of the Steering Committee.

Strategies

- **The Steering Committee will meet to discuss and develop a communication plan to promote the Sector Partnership.**
- **Present members of the Steering Committee will distribute copies of the Executive Summary to their stakeholders.**
- **The full report will be distributed to all Steering Committee members.**
- **CIPS Saskatchewan will present the results of the study nationally within CIPS.**

4. The Steering Committee identified there is a need to promote an awareness of the Information Technology education and training programs/courses available in the province for employers and IT managers.

Strategies

- **Create a comprehensive education and training database.**
- **Determine a method for upgrading, maintaining and distribution of this database.**
- **Promote and raise awareness of IT Conferences and Workshops that are available for the industry.**

- **The Steering Committee in partnership with key employers co-ordinate the organizing of relevant conferences.**

5. The Steering Committee recognizes there is a need to market and promote the career options available. Also, to encourage and increase participation of women, visible minorities, persons with disabilities, youth and aboriginal peoples in the workforce.

Strategies

- **Create an awareness of career options by working with the K-12 school system to promote the industry.**
- **Identify other stakeholders that should be included and work with them.**
- **Promote the value of Science fairs and participate in them.**
- **Offer mentorship and on-the-job training to students to address the increased competition there is for them.**
- **In partnership with other stakeholders, SIAST, the Universities, the Aboriginal institutions, regional colleges and the industry, develop opportunities to increase the participation of aboriginal people, women, youth, visible minorities and person with disabilities in the IT industry workforce.**

6. The Steering Committee in partnership with CIPS Saskatchewan will work to raise the awareness of the accreditation and certification options available.

Strategies

- **CIPS Saskatchewan as a member of the Steering Committee will develop a strategy to promote the benefits of accreditation and certification.**
- **Create and make available a comprehensive database of options for employers..**

7. The Steering Committee needs to facilitate and conduct follow-up survey and research work to ensure trends and changes that are occurring are captured and addressed.

Strategies

- **Research what's happening in other provinces and internationally.**
- **Monitor the current market demand to anticipate and prepare for change.**

8. The Steering Committee and industry establish a mechanism with the education and training providers in the province on ways to promote the manner in which programs and courses are offered, what programs are already available and the skill sets graduates of these programs and courses leave with.

Strategies

- **The education and training providers work with the Steering Committee to develop the process.**
- **A more effective communication and promotion plan is needed in order for employers to become better informed.**

- **Education and training providers need to be participants in the discussions that take place in order to be better prepared to provide graduates with the skill sets to meet industry needs.**

9. The Steering Committee in partnership with industry and other stakeholders need to work together to develop strategies to address recruitment and retention, professional development and business growth.

Strategies

- **Set up separate task teams to focus on each area separately.**
- **Bring in experts who can assist in addressing these issues through their experiences in what was done elsewhere or for other sectors.**
- **Hold focus groups to garner input and feedback.**

8.0 Next Steps

Over the next six months, the Steering Committee in partnership with CIPS Saskatchewan, industry, training providers and other key stakeholders will:

1. Develop a communication strategy to ensure communication of the results of the needs study is distributed to as wide an audience as possible.
2. The Steering Committee needs to explore potential funding and resource sources as well as partnership contributions to sustain themselves in order to carry on and implement the recommendations and next steps.
3. Research the education and training database and the most appropriate manner in which to maintain and up-date it regularly.
4. Review the existing membership of the Steering Committee.
5. Develop a marketing strategy that will promote the industry.
6. Develop a marketing strategy that will aid in increasing the participation rate in the workforce for women, aboriginal people, visible minority people and persons with disabilities.

The process to address these next steps is as follows:

- The Steering Committee will arrange a meeting of the Steering Committee to discuss these next steps and how they will be addressed.
- The Steering Committee will identify who should be approached to join as a member of the Steering Committee. A potential new member is the Saskatchewan Advanced Technology Association (SATA).
- The Partnership will discuss ways of continuing the Steering Committee through sharing the costs of meetings, chairing the meetings, developing proposals for financial support and identifying who should assume a greater leadership role.
- The Steering Committee will finalize the details of an effective communication plan.

APPENDIX A: Education and Training Database

DISCLAIMER:

The information provided in this education and training database is in no way complete and concise. This is due to the fact that there have been changes in the number and type of trainers and, in many cases, the providers of the programs offer a wide variety of courses at various times throughout the year and in different locations. The database identifies some of the key providers and some of the programs they offer. To obtain a complete list and particulars about a program or course, contact information for the providers has been listed. The Steering Committee is planning to undertake a more detailed research and analysis of education and training programs offered in this province in the next phase of their work.

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Computer Works

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Programmer Analyst/Internet Solutions Developer
Network and Internet Support Specialist: Microsoft Windows 2000

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McKay Tech Inc.

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Lotus Application
Technical Training Services
Adobe Application

MicroAge Saskatoon

844 -51st Street East, Saskatoon, SK S7K 5C7, T (306) 242-4000 F (306) 242-1501
Web: www.microagesaskatoon.com

Microsoft Office User Specialist: Microsoft Office 97 Master
Microsoft Office User Specialist: Microsoft Office 97- Expert
Microsoft Office 97

Mnemonic Enterprises

138 Fairford Street West, Moose Jaw, SK S6H 1V3, T (306) 691-2881
F (306) 693-0772

Computer Applications

National College

Western Office, Suite 402, 814 Richards Street, Vancouver, BC V6B 3A7,
T (604) 454-3154 F (604) 988-6560 Web:www.nationalcollege.ca/

Microsoft Office 97 Certificate Program (M.O.U.S)
PC Applications Specialist
Desktop & Digital Design Certificate Program
Internet & Web Page Design Certificate Program

North West Regional College

Battlefords Campus, 10702 Diefenbaker Drive, North Battleford, SK, S9A 4A8, T (306)-937-5100, F (306)445-1575, Web: http://www.nwrc.sk.ca/

Word Processing
Microsoft Word 2000 - Levels 1,2,3
Microsoft Excel 2000, Levels 1and 2
Microsoft Access 2000 - Level 1
Windows 98 - Level I
Automated Office User Specialist
E-mail using Netscape Navigator
Computer Applications

Parkland Regional College

Four branch centers: Melville, Yorkton, Canora and Esterhazy. Main Office: 72 Melrose Ave.

Computer Applications

PBSC Computer Training Center

Princeton Towers 602-123 2nd Avenue S, Saskatoon, SK S7K 7E6, T 1-866-525-PBSC (7272), F (306)447-7275

Certified Internet Webmaster
Microsoft Certified Solution Developer
Lotus Certification
PC Telephony Integration Certification
Microsoft Certified Database Administrator
Microsoft Certified Trainer
Microsoft Certified System Engineer
Microsoft Certified Professional and Site Building
Microsoft Certified Professional
Novell Certification Programs
A+ Certification

5th Flr-1801 Hamilton REGINA, SK T (306) 522-8552 F (306) 522-8805 T 1-800-668-7246 Web: http://www.pbsc.com/technical/tbt/systemone.asp

SystemONE - PBTDesktop Computer Based Training

Saskatchewan Indian Institute of Technologies

Saskatoon Campus: 2nd Floor, 229-4th Ave. S. Saskatoon, SK S7K 4K3, T (306)373-4777, F (306) 373-4977 Web: ht.//www.siit.sk.ca/.

Computer Information Systems
Computer Applications
Computer Applications
Information Technology
Computer Support Technician

Saskatoon Business College

221 Third Avenue North Saskatoon, SK S7K 2H7, T (306) 244-6333 Email: sbcstaff@quadrant.net

Computerized Accounting Technician
Administrative Assistant, Computer Applications Major

S.C.E.T.C.H.

900 Midtown Plaza, 201 – 1st Street South, Saskatoon, SK S7K 1J9, T (306) 242-8006, F (306)242-8014, Email: toont@sk.sympatico.ca

3D Animation and Game Design
Multimedia

Science Applications International Corporation

360-10 Research Drive, Regina, SK S4S 7J7 Web: www.saic.com

SAIC Interactive Training

SIAST Kelsey Campus

Idylwyld and 33rd Street, PO Box 1520, Saskatoon SK S7K 3R5, T (306)933-6390 Email: NSAKelsey@siast.sk.ca

Computer Systems Technology
CISCO Certified Network Associate (CCNA) Training
CAD/CAM
Authorized AutoCAD Training Centre (ATC)
Electronic Systems Engineering Technology
Electronic Technician
Extension – wide variety of application training.

SIAST Meadow Lake Centre

720 5th Street West, PO Box 9000, Meadow Lake SK S9X 1V8, T (306)236-7620, Email: NSAWoodland@siast.sk.ca

Office Education - Computer Clerk Specialty

SIAST Palliser Campus

Saskatchewan Street and 6th Avenue NW, PO Box 1420, Moose Jaw SK S6H 4R4, T (306)694-3200, Email: NSAPalliser@siast.sk.ca

Computer Aided Design and Drafting Technology
Computer Engineering Technology
Business - Computer Information Systems Specialty
Electronic Engineering Technology
Geomatics Technology
Co-op Program for Technologies

SIAST Wascana Campus

4500 Wascana Parkway, PO Box 556, Regina SK S4P 3A3, T (306)798-4356, Email: NSAWascana@siast.sk.ca

Office Education - Computerized Office Assistant
Electronic Communications Technician
Extension – various application courses

SIAST Woodland Campus

1100 - 15th Street East, PO Box 3003, Prince Albert SK S6V 6G1, T (306)953-7000, Email: NSAWoodland@siast.sk.ca

Computer System Support
Office Education - Computer Clerk Specialty
Micro-Electronics Technician
Geographic Information Science (GIS)

Studio Saskatoon

900 Midtown Plaza, 201 – 1st Street South, Saskatoon, SK S7K 1J9, T (306) 242-8006, F (306)242-8014, Email: toont@sk.sympatico.ca

Macintosh Computer Systems

Universal Career College

226 20th St. E, Saskatoon, SK S7K 0A6, T (306) 665-5577

Computer Systems Administer

University of Regina

College West 308, University of Regina , 3737 Wascana Parkway, Regina, SK S4S 0A2, T (306)585-4632 F (306)585-4745 Web: www.uregina.ca

Ph.D. in Computer Science
Masters of Science Program
Co-operative Work/Study Program in Computer Science
Certificate in Computer Science
Computer Science Bachelor of Science Degree
Computer Science Bachelor of Science Honours Degree

University of Saskatchewan

Engineering Building, 1C101, 57 Campus Drive, Saskatoon, SK S7N 5A9, T (306)966-4886 F (306) 966-4884

Master of Science Degree- Computer Science
Ph.D. in Science- Computer Science

APPENDIX B: Survey Instruments

Survey #1

Thank you for taking part in the IT Sector Partnership survey. The sector partnership is made up of members of the Saskatchewan Section of the Canadian Information Processing Society, industry and training providers and is funded by Saskatchewan Post-Secondary Education and Skills Training. We are interested in obtaining information from you regarding training and human resource issues in the IT Industry.

Your input will help identify current and future training and human resource needs in the industry. This will help the Saskatchewan IT Industry to facilitate the development of training programs to meet industry needs.

Your answers will be kept **confidential** and summarized in an aggregate format. Individual survey responses will only be reviewed by the consultant and staff involved in the data collection.

Section One: Company Information

1. How would you describe your business?

- ☐ Market IT services to other businesses.
- ☐ Use IT for internal purposes only.
- ☐ Both external and internal
- ☐ Training and education
- ☐ Other (specify) _____

2. Is your business?

- ☐ Privately owned
- ☐ Publicly owned
- ☐ Provincial crown corporation
- ☐ Federal crown corporation
- ☐ Provincial government department
- ☐ Other (specify) _____

3. Which of the following does your IT business involve?

- ☐ Manufacturing (if yes complete part B)
- ☐ Services (if yes complete part C)
- ☐ Combination (if yes complete part B and C)
- ☐ Other (please list) _____

Part B (manufacturing)

- ☐ Communications & telecommunications equipment
- ☐ Electronic components
- ☐ Computer equipment
- ☐ Instrumentation
- ☐ Other _____

Part C (services)

- ☐ Cable television
- ☐ Telecommunications services
- ☐ Consulting
- ☐ Software and computer services
- ☐ Office machinery rental & leasing
- ☐ Other _____

4. How many people work in your company in Saskatchewan, (full time, part-time, contract) including yourself?

- ☐ Less than 10? How many? _____
- ☐ 10 or more? How many? _____

5. How many people in your company in Saskatchewan, (full time, part-time, contract) including yourself are considered to be in IT positions.

Full Time positions _____
Part Time positions _____
Contract positions _____
TOTAL _____

6. How long has your company been in business in Saskatchewan?

- ☐ Less than 1 year
- ☐ 1 year but less than 5 years
- ☐ 5 years but less than 10 years
- ☐ 10 years or more

Section Two: Employment Projections

The Software Human Resource Council in consultation with CIPS and representatives from industry developed the Occupational Skills Profile Model to **reflect software work in the marketplace.** To have continuity in our data collection we would like to use the OSPM for the following question.

7. Please indicate which of the following IT occupations your company currently employs. **If an employee has more than one occupation please assign the occupation for which the employee spends the most time.**

Of these categories, how many do you expect to employ in 5 years? Provide your best estimate based on the assumption there will be an adequate supply of IT personnel in Saskatchewan in 5 years.

Employed by Company	Currently Employ			In 5 Years		
Category	Full-Time	Part-Time	Contract	Full-Time	Part-Time	Contract
Informatics Technical						
Software design & delivery						
Analysis design						
Analysis programming						
Programming						
Total						

Software design & delivery — *Define, design, construct, test, deliver and modify engineered systems containing software as the major component.*

Analysis design — *Determine if and how informatics might be used to provide solutions. Prepare and ensure the validity of detailed specifications for all components of an information system or sub-system.*

Analysis programming — *Produce and implement properly engineered and tested software solutions to meet defined business/technical/organization needs.*

Programming — *Constructing properly engineered software assemblies and bringing together assemblies into systems. Verifying assemblies are correctly tested.*

Employed by Company	Currently Employ			In 5 Years		
Category	Full-Time	Part-Time	Contract	Full-Time	Part-Time	Contract
Informatics Evaluation						
Business analysis & Service level management						
Capacity & performance						
Technical architecture						
Total						

Business analysis & service level — *Carrying out investigatory, feasibility and analytical studies to produce outline specifications in preparation for constructing information systems.*

Capacity & performance — *Matching hardware, operating system software and applications system capacity. Throughput performance measurement and acceptance testing for new applications.*

Technical architecture — *Designing, developing, evaluating, integrating business applications, technical environments, operating systems, etc.*

Employed by Company	Currently Employ			In 5 Years		
Category	**Full Time**	**Part Time**	**Contract**	**Full Time**	**Part Time**	**Contract**
Informatics Business						
Informatics management						
Informatics consultancy						
Problem management						
Project management						
Total						

Informatics management — *Management of all resources required to plan for and deliver properly engineered informatics services to their users at all stages of the systems life cycle.*

Informatics consultancy — *Providing, commonly from outside source, strategic advice/assistance in strategy, policy, architecture, technology, design, construction, etc of informatics.*

Problem management — *Diagnosing, assessing, circumventing, and finding remedies for service incidents (deviation form planned information system behavior).*

Project management — *Coordinating systems development for major applications.*

Employed by Company	Currently Employ			In 5 Years		
Category	**Full Time**	**Part Time**	**Contract**	**Full Time**	**Part Time**	**Contract**
Informatics Operations						
Operations routine						
Systems programming						
Audit						
Total						

Operations routine — *Routine physical and logical operation of informatics hardware and software.*

Systems programming — *Provide expertise in developing, installing, testing etc. and maintaining externally/internally supplied systems software.*

Audit — *Third party review/assessment of information systems and software production quality management.*

Employed by Company	Currently Employ			In 5 Years		
Category	**Full Time**	**Part Time**	**Contract**	**Full Time**	**Part Time**	**Contract**
Informatics Integrity						
Network support						
User/technical support						
Help desk						
Security						
Quality assurance						
Testing						

Network support — *Planning, installing, providing routine control over and handling exception situations in relation to quality communications network services as part of an overall information system.*

User/technical support — *Providing direct technical support to users/customers of an informatics service.*

Help desk — *Providing a rapid response inquiry service to users/customers of an informatics service facility, usually by telephone, to help resolve difficulties.*

Security — *Provide specialized expertise/practical assistance covering physical, electronic, technical security facets of informatics.*

Quality assurance — *Providing expertise in the application of quality planning assurance techniques to all stages of the information systems and software development life cycle.*

Testing — *Validating that deliverables meet approved specifications. Includes activities in the complete software and project life cycles.*

Employed by Company	Currently Employ			In 5 Years		
Category	**Full Time**	**Part Time**	**Contract**	**Full Time**	**Part Time**	**Contract**
Informatics Data						
Data administration						
Database administration						
Total						

Data administration — *Managing and organizing electronic data.*

Database administration — *Providing specialized expertise and practical assistance in the use of database management systems and manipulation of data for information systems.*

Employed by Company	Currently Employ			In 5 Years		
Category	**Full Time**	**Part Time**	**Contract**	**Full Time**	**Part Time**	**Contract**
Informatics Education						
Education/training						
Technical writing						
Total						

Education training — *Provision of a teaching/instruction/training service at all levels and covering any aspect of expertise coming within the scope of informatics.*

Technical writing — *Design and generation of all forms of guidance material to facilitate the use of any product or service associated with informatics.*

Employed by Company	Currently Employ			In 5 Years		
Category	Full Time	Part Time	Contract	Full Time	Part Time	Contract
Other – List						
Total						

TOTAL CURRENT POSITIONS _____ **(equal to Question 5)**

8. Are there any IT positions in your company currently vacant due to a lack of qualified candidates?

☐ Yes

Number of positions _____
What positions are they?

List	Period of time vacant (in months)
1.	
2.	
3.	

☐ No

9. Any additional comments you would like to provide regarding vacant positions?

10. How many positions in your company filled by contract positions would be filled with full time positions if qualified candidates were available?

☐ No contract positions.
☐ No contract positions would be filled by full time position.
☐ Number of contract positions that would be filled if qualified personnel were available _____

What positions are they? Please list.

Any additional comments?

11. Do you think there is a shortage of IT workers in Saskatchewan at present?

- ☐ Yes
- ☐ No

Explain. (What occupations etc.)

12. Do you think there will be a shortage of IT workers in Saskatchewan in 5 years?

- ☐ Yes
- ☐ No

Explain. (What occupations etc.)

Section Three: Employee Profile

13. How many of your IT employees are in the following age categories?

	Up to 24	25-34	35-44	45-54	55-64	65 and over
Full Time						
Part Time						

Check totals to question 5.

14. What employee benefits do you provide? (check all applicable)

- ☐ None other than the required Employment Insurance (EI) and Canada Pension (CPP) benefits
- ☐ Medical/dental/disability/life insurance
- ☐ Bonuses/ incentive plan
- ☐ Retirement benefits
- ☐ Financial training assistance
- ☐ Profit sharing
- ☐ Stock options
- ☐ Sick leave
- ☐ On the job training
- ☐ Other *please specify:* _____
- ☐ Other *please specify:* _____

15. How many IT employees do you have in each of the following categories? (i.e., the highest level of education attained)

	High School certificate	Career College diploma	Community College diploma	Bachelor Degree	Masters Degree	PhD
Full Time						
Part Time						
Contract						

Check totals to question 5

16. How many IT employees do you have in each of the following groups?

Group	Employees	
	Female	Male
Aboriginal (*This includes Status Indians, Non Status Indians, Métis, and Inuit*)		
Visible minorities (*Includes persons who, because of their race or color, are in a visible minority in Canada. This may include persons of African ancestry, Asian ancestry, Arabic ancestry, etc. This does not include persons of aboriginal ancestry*)		
Persons with disabilities		
Other employees		

Check totals to question 5

17. Do you think the representation of these groups in your company will increase, decrease, or stay the same over the next five years? (Place an X in the appropriate box.)

(Interviewer please circle one.)

Group	Increase	Decrease	Stay the same	dk	na
Aboriginal					
Women					
Visible minorities					
Persons with disabilities					

18. Do you have any suggestions/recommendations on increasing representation from these groups?

Section Four: Recruitment and Retention

19. The following is a list of difficulties employers may face trying to recruit employees. From your experience, when looking for IT workers, rate the items on the list, with 1 being not a difficulty and 5 being a major difficulty. (Place an X in the appropriate box.)

Difficulty Finding Workers for the IT Industry	**Rating** Not at all → Major					
	1	**2**	**3**	**4**	**5**	**DK**
Lack of applicants with required education						
It is difficult to offer competitive wages						
Lack of applicants with relevant experience						
Lack of applicants with required skills						
Other employers offer better locations						
Other (list)						
Other (list)						

20. What are the two major problems, if any, you have trying to find employees for your IT business?

21. What other problems, if any, do employers face trying to find employees for the IT industry?

22. What methods have you used to recruit IT employees? How effective have they been on a scale of 1 – 5, where 1= very ineffective and 5= very effective. (Place an X in the appropriate box.)

Methods for recruiting	Rating					
	1	2	3	4	5	DK
Newspaper advertising						
Word of mouth						
Informal networking						
Can Sask centres						
University or college recruiting						
Your company web site						
Employment agency						
Internet recruiting						
Other (list)						

23. In the last year where have the majority of your IT employees been recruited from?

- ☐ Within the province
- ☐ Outside the province
- ☐ Not Applicable
- ☐ Don't Know

24. In the last year, how many IT employees left your company and for what reasons:

Reason	Full Time	Part Time
Left voluntarily		
Were terminated		
Were laid off		
Family leave		
Occupational disorder		
Retired		
Other *(specify)*		

25. Do you consider turnover among IT employees in your organization to be a problem?

- ☐ Yes
- ☐ No

Why or why not?

26. What are the most common reasons IT employees give you when they leave your organization?

- ☐ Better wages elsewhere in Saskatchewan
- ☐ Better wages elsewhere in Canada
- ☐ Better wages out of the country
- ☐ Better benefits
- ☐ Going back to school
- ☐ Retirement
- ☐ Left to open their own business
- ☐ Left for personal reasons
- ☐ Left the information technology field for a different career
- ☐ Other (*specify*): _____
- ☐ Other (*specify*): _____
- ☐ Other (*specify*): _____

Section Five: Skill Requirements and Training

27. In your experience approximately how many new IT employees who were graduates of a university were under skilled and required competency or skills training after being hired.

- ☐ None - **Go to Question #29**
- ☐ Don't Know - **Go to Question #29**
- ☐ 1 - 25%
- ☐ 26 - 50%
- ☐ 51 - 75%
- ☐ 76 – 100%
- ☐ Not Applicable

28. What training was required?

- ☐ Specific technical training
- ☐ Communication skills (oral and written)
- ☐ Business and management skills
- ☐ Interpersonal and team building skills
- ☐ Organizational skills
- ☐ Software and IT environments (domain knowledge)
- ☐ Other (*specify*): _____

29. In your experience how many new IT employees who were graduates of community colleges (eg SIAST) were under skilled and required competency or skills training after being hired.

- ☐ None - **Go to Question #31**
- ☐ Don't Know - **Go to Question #31**
- ☐ 1 - 25%
- ☐ 26 - 50%
- ☐ 51 - 75%
- ☐ 76 – 100%
- ☐ Not Applicable

30. What training was required?

- ☐ Specific technical training
- ☐ Communication skills (oral and written)
- ☐ Business and management skills
- ☐ Interpersonal and team building skills
- ☐ Organizational skills
- ☐ Software and IT environments (domain knowledge)
- ☐ Other (*specify*): _____

31. In your experience how many new IT employees who were graduates of career colleges were under skilled and required competency or skills training after being hired?

- ☐ None - **Go to Question #33**
- ☐ Don't Know - **Go to Question #33**
- ☐ 1 - 25%
- ☐ 26 - 50%
- ☐ 51 - 75%
- ☐ 76 – 100%
- ☐ Not Applicable

32. What training was required?

- ☐ Specific technical training
- ☐ Communication skills (oral and written)
- ☐ Business and management skills
- ☐ Interpersonal and team building skills
- ☐ Organizational skills
- ☐ Software and IT environments (domain knowledge)
- ☐ Other (*specify*): _____

33. Due to the rapid changes taking place in the IT industry, ongoing training is considered to be a requirement.

- ☐ Disagree
- ☐ Agree. If yes, please identify the three main difficulties in achieving your training objectives.

- ☐ Lack of time
- ☐ Lack of resources
- ☐ Lack of training available in the province
- ☐ Lacking awareness about training options/programs
- ☐ Logistics of scheduling training sessions
- ☐ Lack capability of in-house expertise
- ☐ Cost of training
- ☐ Accessibility to training
- ☐ Cannot afford to take people off the job for training
- ☐ Other (*specify*): _____

34. What methods of training are you currently providing to your IT employees? (check applicable methods)
(Formal training – structured format to develop employee skills and knowledge either in-house or externally.)
(Informal training – acquire various skills or knowledge as part of doing the job.)

- ☐ Formal training
- ☐ Informal training
- ☐ On-the-job training of new employees
- ☐ No training is presently being undertaken
- ☐ Other (*specify*): _____

35. In your opinion what is the best way to provide IT employees with the ongoing skills they/your business will require?

- ☐ Formal training (internal)
- ☐ Formal training (external)
- ☐ Combination of internal and external formal training
- ☐ Informal training (internal)
- ☐ New recruitment
- Other (explain) _____

36. What skills are current IT employees lacking where training is presently being provided?

List:

37. Are you aware of any training programs currently provided in the province?

☐ Yes

List:

☐ No

38. Do existing education and training programs offered in Saskatchewan meet your company's training needs?

- ☐ Yes
- ☐ No
- ☐ Undecided

(If no or undecided) What type of training is required by your company?

Section Six: Industry Trends

39. Are there any new occupations emerging or dramatic changes occurring to existing occupations in the industry? Please identify the cause of this.
(Interviewer: please check either emerging or changing.)

Occupation	Emerging	Changing	Additional comments

40. In 5 years what skills do you think will be the most critical to the success of your business? Please rank the top 3.

- ☐ Systems analysis
- ☐ Programming
- ☐ Client/server implementation/management
- ☐ Database development
- ☐ Database administration
- ☐ Website design/maintenance
- ☐ E commerce
- ☐ Other (*specify*): _____
- ☐ Other (*specify*): _____

41. What in your opinion are the three greatest challenges facing your business?

42. What in your opinion are the three greatest challenges facing Saskatchewan's IT industry?

43. Are there other factors that have not been mentioned yet that affect your company, the industry, employees, or the labour markets that you would like to comment on?

Section Seven: Certification and Professionalism

44. Does your business have ISO 9000 level certification?

- ☐ Yes
- ☐ No

45. Does your business have any other level of certification or accreditation?

- ☐ Yes. If yes, please list.
- ☐ No

46. Are you familiar with the CIPS Computer Science Accreditation Council or College Program Accreditation Council?

- ☐ Yes
- ☐ No

47. Are you familiar with the CIPS Information Systems Professional (I.S.P.) designation?

☐ Yes
☐ No

If no, go to Section Eight.

48. Do you look for the I.S.P. designation when recruiting new IT employees?

☐ Yes
☐ No

49. Do you encourage IT employees to obtain the I.S.P. designation?

☐ Yes
☐ No

Section Eight

Thank you! Your responses will help the Saskatchewan IT Sector Partnership in making recommendations regarding human resource and training issues for the industry.

Can I please get the following information?

Contact Name: _____

Business Name: _____

Phone Number: _____

Email: _____

Street Address: _____

City/Town/Box #: _____

Postal Code: _____

Would you like a copy of the executive summary e-mailed to you when the study is completed?

☐ Yes
☐ No

Would you recommend or encourage one of your employees to take part in a focus group as part of this study? May we contact you at a later date in this regard?

- ☐ Yes
- ☐ No

Survey #2

Speak to Head of Information Technology Department or Human Resources.

Hello, this is _____ calling from the Trimension Group on behalf of the Information Technology Industry Sector Partnership. The sector partnership is made up of members of the Saskatchewan Section of the Canadian Information Processing Society, the industry and training providers. It is funded by Saskatchewan Post-Secondary Education and Skills Training. Today, we are interested in obtaining information from you regarding training and human resource issues in the Information Technology Industry.

Your input will help identify current and future training and human resource needs in the industry. This will help the Saskatchewan Information Technology Industry to facilitate the development of training programs to meet industry needs.

Do you currently have any Information Technology employees in your company?

- ❑ Yes (Go to Contact Name)
- ❑ No (Get Information up to #1 and then end survey)

Do you contract out your computer services or do you maintain the computers yourself?

- ❑ Contract Out (Get Information up to #1 and then end survey)
- ❑ Do Yourself (Get Information up to #1 and then end survey)
- ❑ Combination of Both (Get Information up to #1 and then end survey)

Section One: Company Information

Contact Name: _____

Business Name: _____

Phone Number: _____

Fax Number: _____

Street Address: _____

City/Town, Prov.: _____

Postal Code: _____

1. How many people in your company in Saskatchewan, (full time, part-time, contract) including yourself are considered to be in Information Technology (IT) positions.

Full Time positions _____
Part Time positions _____
Contract positions _____
TOTAL _____

2. How many employees do you have in each of the following positions and how many to you expect to employ within the next 1 - 2 years? **If an employee has more than one occupation please assign the occupation for which the employee spends the most time.**

Position	Current # of Employees	Employees in 1 - 2 Years
Programming/Software Development - write programs for you or your customers		
Systems/Business Analysis & Design - meet with client to determine what they want; provide turnkey packages for others; develop customized solutions (software, hardware and installations)		
Web-Based Application Development - solely deals with internet items		
Computer Support & Network Administration - hardware technician; operations; people needed to support infrastructure; user/technical support, security; help desk; provide hardware and operating support for Network.		
Administrative Support - clerical duties; Microsoft/Access Applications; data entry		
Database Administrators - design databases, maintain databases, extract information from databases, manipulate data		
Multi-Task Resource Person - primarily those in small businesses who do everything because they do not have a large enough staff to be specialized		
Other		

3. Are there any Information Technology positions in your company currently vacant?

- ❑ Yes
- ❑ No (Go to #4)

Please use the list provided in #2 to describe the positions that are vacant.

Number of positions _____
What positions are they?

List Position	Period of time vacant (in months)
1. _____	_____
2. _____	_____
3. _____	_____

4. The following is a list of difficulties or problems employers may face trying to recruit employees. From your experience, when looking for Information Technology workers, do you find that:

   There is a lack of applicants with the required education.
   - ❑ Yes
   - ❑ No

   It is difficult to offer competitive wages.
   - ❑ Yes
   - ❑ No

   There is a lack of applicants with relevant experience.
   - ❑ Yes
   - ❑ No

   There is a lack of applicants with required skills.
   - ❑ Yes
   - ❑ No

   Other employers offer better locations/incentives/benefits (these could include Medical/dental/disability/life insurance; bonuses; retirement benefits; financial training assistance; profit sharing; stock options; sick leave; on-the-job training)?
   - ❑ Yes
   - ❑ No

5. Do you experience any other recruitment difficulties?

6. In the last year, where have the majority of your Information Technology employees been recruited from?

   - ❑ Within the province
   - ❑ Outside the province
   - ❑ Haven't recruited in the last year

Section Two: Recruitment and Retention

7. Is employee retention among Information Technology employees in your organization an issue?

   - ❑ Yes
   - ❑ No

8. In the last year, how many Information Technology employees left your company for one of the following reasons:

Reason	How Many
Left voluntarily	
Were terminated	
Were laid off	
Internal Transfer	
Retired	
Other *(specify)*	

9. Of those who left voluntarily, what are the most common reasons given for why they left? (Check all that apply.)

- ❑ Better opportunities elsewhere in Saskatchewan
- ❑ Better opportunities elsewhere in Canada
- ❑ Better opportunities out of the country
- ❑ Going back to school
- ❑ Retirement
- ❑ Other (*specify*) _____

10. How many of your Information Technology employees are in the following age categories?

	Up to 24	25-34	35-44	45-54	55-64
Full Time					
Part Time					

11. Is your long-term business growth being compromised because of a lack of a skilled labour force?

- ❑ Yes
- ❑ No

Section Three: Skill Requirements & Training

12. Do you have any difficulties providing your employees with the opportunity for ongoing training?

- ❑ Yes
- ❑ No (Go to #14)

13. Why? (Please check off those that apply)

- ❑ Lack of time
- ❑ Lack of resources (human resources and/or monetary resources)
- ❑ Lack of training available in the province
- ❑ Lack of training available anywhere
- ❑ Lacking awareness about training options/programs
- ❑ Accessibility to training
- ❑ Other _____

14. What is the best way to provide Information Technology employees with the ongoing skills required for the industry?

- ❑ In-house training (by own staff; on-the-job training)
- ❑ External training (bring in instructor or let employees go out for training)
- ❑ Combination of In-house and External training
- ❑ Other _____

15. Do existing education and training programs offered in Saskatchewan meet your company's hiring needs?

- ❑ Yes (Go to #17)
- ❑ No

16. Why not?

17. Do existing education and training programs offered in Saskatchewan meet your company's ongoing training needs for existing employees?

- ❑ Yes (Go to #19)
- ❑ No

18. Why not?

Section Four: Demographics

19. Is your business?

- ❑ Privately owned
- ❑ Publicly owned
- ❑ Provincial crown corporation
- ❑ Federal crown corporation
- ❑ Provincial government department
- ❑ Other (specify) _____

20. How long has your company been in business in Saskatchewan?

- ❑ Less than 1 year
- ❑ 1 year but less than 5 years
- ❑ 5 years but less than 10 years
- ❑ 10 years or more

21. How many Information Technology employees do you have in each of the following groups?

Group	**# of Employees**
Aboriginal (*This includes Status Indians, Non Status Indians, Métis, and Inuit*)	
Visible minorities (*Includes persons who, because of their race or color, are in a visible minority in Canada. This may include persons of African ancestry, Asian ancestry, Arabic ancestry, etc. This does not include persons of aboriginal ancestry*)	
Persons with disabilities	
Women	

Section Six: Certification and Professionalism

22. Are you familiar with the CIPS Information Systems Professional (I.S.P.) designation?

- ❑ Yes
- ❑ No (Go to # 25)

23. Do you look for the I.S.P. designation when recruiting new Information Technology employees?

- ❑ Yes
- ❑ No

24. Do you encourage Information Technology employees to obtain the I.S.P. designation?

- ❑ Yes
- ❑ No

25. Do you look for any other type of certification (such as A+ Certification; Microsoft Certification) when recruiting new Information Technology employees?

- ❑ Yes
- ❑ No

26. Do you encourage Information Technology employees to obtain any other type of certification (such as A+ Certification; Microsoft Certification)?

    ❑ Yes
    ❑ No

27. Would you like a copy of the executive summary of the report from the study e-mailed to you when it is completed?

    ❑ Yes
    ❑ No

28. Would you or a member of your company be willing to participate in a focus group as part of this study?

    ❑ Yes
    ❑ No (End Survey)

29. Who can we contact?

    Name: _____ Phone: _____

Thank you! Your responses will help the Saskatchewan Information Technology Industry Sector Partnership in making recommendations regarding human resource and training issues for the industry.

APPENDIX C: Job Descriptions

Software design & delivery	Define, design, construct, test, deliver and modify engineered systems containing software as the major component.
Analysis design	Determine if and how informatics might be used to provide solutions. Prepare and ensure the validity of detailed specifications for all components of an information system or sub-system.
Analysis programming	Produce and implement properly engineered and tested software solutions to meet defined business/technical/organization needs.
Programming	Constructing properly engineered software assemblies and bringing together assemblies into systems. Verifying assemblies are correctly tested.
Business analysis & service level	Carrying out investigatory, feasibility and analytical studies to produce outline specifications in preparation for constructing information systems.
Capacity & performance	Matching hardware, operating system software and applications system capacity. Throughput performance measurement and acceptance testing for new applications.
Technical architecture	Designing, developing, evaluating, integrating business applications, technical environments, operating systems, etc.
Informatics management	Management of all resources required to plan for and deliver properly engineered informatics services to their users at all stages of the systems life cycle.
Informatics consultancy	Providing, commonly from outside source, strategic advice/assistance in strategy, policy, architecture, technology, design, construction, etc of informatics.
Problem management	Diagnosing, assessing, circumventing, and finding remedies for service incidents (deviation form planned information system behavior).
Project management	Coordinating systems development for major applications.
Operations routine	Routine physical and logical operation of informatics hardware and software.

Systems programming	Provide expertise in developing, installing, testing etc. and maintaining externally/internally supplied systems software.
Audit	Third party review/assessment of information systems and software production quality management.
Network support	Planning, installing, providing routine control over and handling exception situations in relation to quality communications network services as part of an overall information system.
User/technical support	Providing direct technical support to users/customers of an informatics service.
Help desk	Providing a rapid response inquiry service to users/customers of an informatics service facility, usually by telephone, to help resolve difficulties.
Security	Provide specialized expertise/practical assistance covering physical, electronic, technical security facets of informatics.
Quality assurance	Providing expertise in the application of quality planning assurance techniques to all stages of the information systems and software development life cycle.
Testing	Validating that deliverables meet approved specifications. Includes activities in the complete software and project life cycles.
Data administration	Managing and organizing electronic data.
Database administration	Providing specialized expertise and practical assistance in the use of database management systems and manipulation of data for information systems.
Education training	Provision of a teaching/instruction/training service at all levels and covering any aspect of expertise coming within the scope of informatics.
Technical writing	Design and generation of all forms of guidance material to facilitate the use of any product or service associated with informatics.

APPENDIX D: Participant Comments

4.3 What positions are they?

The numbers in brackets indicate or represent the companies who have these positions vacant.

- Programmers (20)
- Software Development (15)
- Network Admin (4)
- Web-Based Application Dev. (3)
- Computer Support (3)
- Business Analysis & Design (2)
- Administrative support
- Analysis Programming.
- Data base administration
- DBA type positions.
- Entry of electronic media
- Front line junior position - Client service.
- Graduate level
- Information Operations.
- Information Technology Manager
- Internet Help Desk.
- Linux Administrator.
- Matrix
- Multitask
- Network Analyst
- Network Specialist
- Software maintenance
- Project manager.
- Senior network engineer.
- Support
- Systems Admin.
- Systems development analyst
- Technology Management Service Manager
- There is no funding for the positions.

4.5 Do you experience any other recruitment difficulties?

- Our network is 90% Mac - 10% other platform. Lack of ""Mac heads"".
- Refused (6)
- As soon as we get them trained, they move on to bigger companies
- Attracting skilled employees to a geographically isolated area such as Saskatchewan.
- Attraction to the location
- Basically location Saskatchewan isn't a good province for recruiting.
- Because Information Technology is growing so quickly, it's hard to know what we really need right now. The transients and changes in demand are not reflected in flexible workers.
- Because it is a small town, it is difficult to get help. We can't afford to pay IT employees right now so we are using volunteer people.
- Being in government there is a lot of red tape to hire people.
- Being in the small town of Outlook, it is hard to find people willing to relocate here.
- Competition with other like employers.
- Difficulty in knowing who is available.
- Doesn't apply. We aren't hiring.
- Enough people with proper education with what is needed here.
- Everyone wants to go to Alberta.
- Expectations for salary are too high for their experience.

- Finding the right qualified people.
- Forty five minutes from Regina is a setback, because people will commute to work for a larger company who can offer better money, and more benefits.
- Getting people with good work ethics and trustworthiness.
- Getting quality educated people.
- Government training programs scarce in IT. Training begins on-the-job, not in college. 3-day Oracle DBA course in Calgary =$4500/employee. Require employer loan programs for industry specific training programs for employee so SK remains IT competitive.
- Graduates leaving the province for bigger centres.
- Hard to get people to come to a small town.
- Have to send a lot of our new employees out of the province, to get specialized training.
- Having to compete with people paying higher wages.
- High wages in the U.S.
- I am looking for someone extra t o work on a contract basis one or two hours a week.
- I find that Information Technology people can pretty much choose where they want to go. If they are not getting enough money here, they go to get work in Alberta.
- I have no experience in this area.
- In a rural area, hard to get people to move out from the city.
- It is difficult to get people to work in a rural area.
- It is difficult to get people to work in a small rural area.
- It is not consistent through the year.
- IT people moving to the larger IT industry locations out- of -province.
- Lack of education in our specific field.
- Lack of experienced applicants for both mainframe legacy systems and pc based system.
- Lack of practical, technical knowledge. Need more cross training not only theory.
- Location being in Saskatchewan.
- Location is a big concern. It is difficult to get people to work in smaller communities.
- Location is a major problem. Being in Prince Albert and being in Sask.
- Location, location, location.
- Location, location, location. I think we need to realize what a great place Saskatchewan can be to live in and do business.
- More hands on skills are needed for new recruits.
- Most people don't realize what is required in this line of work.
- New recruits seem to have a lot of attitude, thinking that they know everything because they have taken these courses.
- No (61)
- Not applicable.
- Not enough experience to start into a job.
- Not enough on the job training given to recruitments.
- Not interested in staying in Regina.
- Not targeted to what we need. SIAST has gone to 1 yr. experience, 1 yr application. Not what we need. Need proper end user support. Falling between ed providers finding a targeted program. Colleges don't meet requirements.

- Other companies are prepared to pay employees more.
- People have unrealistic wage expectations coming out of school.
- People need more hands on experience, before entering the work force.
- People with required skill set and attitude.
- Personal attributes.
- Physical location in P.A.
- Recruits are not properly skilled upon leaving their training courses.
- Recruits come in with their certification, and think they know what to do . They have to have more in house training to perform their duties.
- Recruits need more experience with hands on skills.
- Recruits need to have more in house training before entering the work force.
- Retain your own staff.
- No room for advancement. Once people are trained, they go somewhere else.
- Same as above.
- Sask. is a small market, small recruiting ground. Specific technical skills there will be by definition a small supply. This is particularly an issue when looking for 2-5 yrs. experience (Microsoft Exchange, Lotus Notes, Oracle DBA etc.)
- Saskatchewan is not viewed as a place of opportunity. Finding employees with mixed skill set. In a small organization, employees have to learn multiple skills.
- Saskatchewan is not viewed as a place of opportunity. We are losing our educated youth to other provinces.
- Small IT departments requiring IT personnel to have numerous responsibilities and tasks.
- Some students portray information on their resumes which may not indicate their skill level.
- Sometimes there is specific programs and the challenge is finding someone with that training.
- Started going to Moose Jaw to get recruits. SIAST seems to have the best courses available.
- The amount or recent grads out number the available jobs that can provide entry level experience to grad, so that employees can begin to grow & mature in their professionalism & skills. Ultimately, resulting in long term gainful employment.
- The demographics of being in the Prince Albert area.
- The perception of better employment opp. elsewhere is 1 of issues facing employers in SK. Another is issue of lower taxes & greater life-style advantages. Employers often train an employee only to see that employee leave & benefit another business.
- There are not technicians available here.
- Training is for large networks only, not for small networks.
- Tried to hire customer service person hard to fill.
- Very difficult to judge someone's technical ability through typical interview processes. No real way to gage their organizational or customer service skills either.
- We also like people who can integrate into our team, so are good team players as well as being capable of dealing with clients so having good communication and social skills. This is not always a typical I.T. person.
- We are trying to bring people from other provinces but they are unwilling to come here.

- Would like to see more hands on hardware tech. Knowledge.
- Yes, Industry specific training.

4.9 Of those who left voluntarily, what are the most common reasons given for why they left? (Check all that apply.) N=134

- Are looking for a new challenge in the field. (3)
- Maternity leave. (2)
- Spouse transferred. (2)
- Wage. (2)
- Moving to their "dream job".
- Prefer more structured IT environment, rather than ""unpredictable"" consulting environment.
- Burn out.
- Family emergency out of country.
- He had another business and he was in over his head.
- He went to another company voluntarily.
- Internal transfer to sister company.
- It was a project that we needed this person for and when it was completed he was finished.
- It wasn't his type of job.
- Lower taxes.
- More commitment to full time.
- Move for family reasons.
- No employee has ever left.
- She was drinking a lot.
- Used our technology to set up own business.
- Location.

4.12 Do you have any difficulties providing your employees with the opportunity for ongoing training?

4.13 Why?

- An understanding that training is not IT training but training in the area you are working in, i.e. bookkeeping, agriculture, finance, etc.
- Because of our long distance to Saskatoon, it is difficult to get to any training. Prince Albert doesn't offer what we need.
- Because we are in a rural area it is difficult to compete with people in the urban areas.
- Courses are offered basically in just Regina & Saskatoon.
- Don't need to know more for job at this time.
- Equal opportunity re subsidized training.
- I feel that short 1-2 night seminars would be helpful. Everything is 6 months long.

- It is a tremendous cost to train an employee and we are unsure of whether the employee will stay.
- Lack of funding.
- Lack of money.
- Lack of specific courses for our needs.
- Lack of specific programs and training on how to understand the new tech in industry in support products. Most miss the mark as what is required as end user support point of view.
- Losing people after we train them.
- Mac specific training not often offered.
- Mac specific training not often offered.
- Only around for the term of the project each project different.
- Specific needs training.
- They were advertised as having seminars in all major cities in Canada but the closest were in Wpg., Calgary & Edmonton.
- We are so busy, we can't afford to let anyone go to any training. We need more IT employees.
- We need to do special internal training.

4.14 What is the best way to provide Information Technology employees with the ongoing skills required for the industry?

- Brief workshops.
- Combination of internal and external formal training. Informal training (internal). New recruitment.
- Contract an instructor for in house training.
- Cooperative in house where you bring in the experts.
- Employees learn how to train themselves through using online resources.
- Formal training (internal).
- Hire employees who have the required skills and get them to share this new knowledge with others in the company.
- Informal training (internal).
- Informal training (internal).
- Informal training (internal).
- Informal training (internal).
- Informal training (internal).
- Informal training (internal).
- Inside training, outside seminars.
- Internet training also
- It is difficult to answer these as asked. The best way to provide training in most cases relates to the specific need. Each of the above situations could be the best in any given situation.

- New recruitment.
- On Line training would be the best method of training.
- On-line courses
- People respond better from external training because of exposure to other people in industry to build the network. Time out is difficult to do.
- Some people could get training through the Internet.
- Timely business planning.
- Training by correspondence.
- We use whatever meets our needs and is available at reasonable costs.

4.16 Why not?

- Programs are for theory, can't keep up with the technology.
- A+ certification is needed for employment in my business, and I find that a lot of applicants don't have it. If they do have it then they don't know how to apply it properly in the work force. Lots of errors being made.
- All the courses are not available in the province
- All the programs that we're working with have only been developed within the last 6 months and there is no school offering training in our areas. We are right in the front lines.
- Anything older that a couple of months is out of date.
- Because people lack the certification like Microsoft. Most graduates have diplomas or degrees but this is not what we are looking for. We prefer more specific training.
- But lacking on training with people skills.
- Can't put the book knowledge to the task, need more on the job training.
- Competitive reason.
- Content not specific enough for our business, need current internet technology.
- Courses needed aren't offered in Saskatchewan. Need to go to Alberta.
- Designed for to large of a market, people are to specialized, in a smaller business we need to know more of everything.
- Don't have the combination training.
- Don't have the proper programs available.
- Emphasis is on the wrong things. Too much on technology and not enough emphasis on problem solving.
- Fairly new industry in province.
- Have to send any new recruits to Calgary, Edmonton or Vancouver for the proper training.
- Have to send people away to train.(systems development)
- high level of training is not available in the province
- I am happy with post secondary training in Saskatchewan but not the skills training offered in Sask.
- I don't know of anyone offering any programming in Saskatchewan.

- In house training is not available, not enough night courses.
- It wasn't meeting our requirements up until a couple of weeks ago when we found a technical college here in Saskatoon where they are teaching what we are looking for.
- Lack of training facilities and institutions.
- Locally there is really not much. Community colleges offer beginner courses but most training is in the large centres.
- Macintosh based training is rarely available.
- More co-op programs with support coming from the educational institution putting it on.
- More field experience.
- Most people don't have the write training. What we need is dual degree electrical engineering and computer science.
- Need more hands on training.
- Need specialized training in Internet Administration.
- Need to know more hands on technical support instead of only theory.
- No enough onsite stuff all book theory.
- No providing the company's needs.
- Not at all trained. May as well not even go to the schools, Waste of money.
- Not enough training. We have specific needs and this requires us to travel elsewhere.
- Not on the progressive edge on what is coming out. On a global plain we are behind.
- Not really the specific courses available.
- Not trained in what we need.
- Our population base is too small for the specialized training we need. E.g. Interactive Project Management Development.
- People need a higher level of training whether it is software programs or hardware technology. What we presently have is so basic. We need people with high skill level because we don't have time for lots of on the job training.
- People need more hardware background, and network operating experience .
- Programs focus on Microsoft based products and not on the products that would be suitable to a mid sized business. Microsoft products are not robust enough.
- Run very specific technology one has to go over seas for training.
- Send to the USA.
- Some programs not offered. (lotus notes)
- Some skills are only available through conferencing.
- Targeted on wrong goals. Need end user support. SIAST good for knowledge of business world.
- Technology changes so fast, that courses don't keep up with it.
- Technology changing so fast it is difficult for the educators to have the students up to date when leaving school.
- The current facilities don't provide proper training.
- The education we receive is not up to par.
- The programming that we use needs to be imported from the United States.
- There are no courses offered anywhere. We are always working with today's software and the schools are teaching yesterdays software.

- There are some schools in Saskatoon that don't provide the level of education we need. One school I feel would provide satisfactory education that being Kelsey.
- There is a lack of necessary skills, when needed to work in our office .Very unique work.
- They are good on history but not in the present or in the future. They are not up to date.
- They are teaching the wrong software on the wrong platform. The courses in Sask. Will learn on software that nobody is using. They should be working on the industry standard.
- They do not recognize my profession in Sask. As they do in Alberta. All the courses here are insufficient. People here are not taught by people who have their Master's Degrees. A good example is Mackay Tech. The government will subsidize Mackay.
- They don't have the skills we need.
- Too general.
- Training outside of the province
- Very little to offer in this province
- We are in a very specialized market.
- We are not getting individuals with a well rounded education as in Calgary.
- We do better hiring people from the printing industry.

4.18 Why not?

1) Language training. 2) Network training. 3) Hands on training.
- All courses are not available in the province.
- At level 3 training program we are using international training as in New York.
- Because I have to retrain anyone who comes in.
- Because its to specialized.
- Because of our population companies don't offer the specialized training we need, like Firewall, Database, Project Management.
- Business is tough so we can't afford to upgrade the employees.
- Business specific training.
- Courses are not available here.
- Courses here are fairly basic and its tough to find courses to meet his needs.
- Courses needed aren't offered in Saskatchewan.
- Courses offered by SAP require our employees to go to Ontario/Quebec or the U.S.. Powerbuilder courses require our employees to either go to Alberta or Manitoba.
- Current technologies and development environments.
- Difficult to find appropriate class that they can take one class a semester, because of work.
- Domain, business and consulting skills.
- Don't see a lot being published, not as effective as they should be.
- Generally speaking, the 2- year college programs seem to provide a sufficient technical foundation.
- Hardware, software, programming, etc.
- Have not checked into them however, I do not necessarily expect Saskatchewan to meet our training needs. We can do training via courses and/or internet access.

- Have to go elsewhere
- have to go outside the province
- Have to go to the States to get training needed.
- Have to travel to the bigger centres to obtain any training.
- Haven' heard of them. Lenex would be great in Sask.
- high level training
- high level training is not available
- Highly tech - or specialized courses are not available.
- I feel that short seminars would be helpful.
- I find that people with university degrees know the books but do not know the practical side of things.
- I received my education in Manitoba, so don't feel equipped to answer .
- I'm unfamiliar with the training being offered.
- In house training is not available, not enough night courses.
- Ingres, GIS, SCO, Unix not available.
- Interactive web development, intranet/extranet environment, specific programming languages.
- Internet training ,or sent by my suppliers to Dallas.
- It is a specialized field and we need people from outside the province to put on seminars for us.
- It is available but the education is too basic. They need a higher level of training and skills.
- It meets the needs in Network Admin. But not in Business and Programming.
- Lack of experience and no interpersonal skills
- Lack of facilities
- Lack of programs.
- Lack of time to take a course while running a business.
- Lots of their stuff is specific to a specific vendor.
- Macintosh based training is rarely available.
- More graphic design info.
- More opportunity for upgrading of Software & IT environments (domain knowledge) for existing staff while on the job. This should be available as night courses so staff can upgrade while continuing to be employed.
- Most courses that we need are in Vancouver or Calgary
- Most have to be sent out of the country for the training that we need them to get.
- Most of what we need is offered out side of Saskatchewan like in B.C or Alberta.
- Most training we need is only provided in big centres like Toronto and Vancouver.
- Much of the training we require & invest in is specific to vendor products (ex Oracle DBA) or specific to our company (methodology, etc.)
- Need Advanced third party software, like New Media Animation.
- Need to send them to other provinces for any specialty training.
- No training courses locally.
- Nobody really does the type of work that we do.

- None of them are approaching us on seminars to brush up on programs & technology. This is a definite business opportunity for colleges. We sent people to Kelsey for Network training and were pleased.
- Not enough training opportunities in Saskatchewan. Eg. In SIAST, the skill sets that they are teaching them are not applicable to the real world.
- Not good enough for having up-to-date technology training.
- Not providing what company needs.
- Not really because programs are a distance away.
- Not the right courses available.
- Nothing offered in the evening, or short term courses. Hard to send them out in the day time.
- Nothing relevant
- Nothing you need.
- Oracle.
- Paradox training is unavailable. Lack of demand within the province.
- Portion isn't available in Saskatchewan.
- Programs have to be imported from the U.S.
- Project management.
- Proper courses not available in this province.
- same
- Same as #16.
- same as above.
- same as above.
- Sask. Doesn't have a large enough market, we go out of prov. For what we need. ex. IT Security, NT training.
- Security training.
- Some is not offered in Regina which makes it more difficult.
- Some of the programs that we need, people would have to go to Calgary.
- Specialized areas are lacking
- Specialized needs.
- Specialized training requirements.
- Specific programming training not provided. Other skills in personal computer training and accounting is provided.
- Subject matter content.
- Targeted on wrong goals. Need end user support. SIAST good for knowledge of business world.
- Technical hardware training specific by vendor.
- Technology as it relates to web sites, database connectivity and e-commerce systems.
- The basics are good. Most of the other stuff is rather new so people have to have trained themselves or worked in the industry.
- The curriculum at the U. Regina is not up to date because of the demand of Information Technology.
- The equipment in higher end lack of highly qualified training personnel.

- The programs are focused in the larger centres.
- The programs are not current enough and the courses may be too long.
- There are not many programs offered in Saskatchewan.
- There aren't any computer training programs for higher level learning.
- There is no training offered outside of our business.
- There is really nothing offered in the Yorkton area.
- They are teaching the wrong software on the wrong platform. The courses in Sask. Will learn on software that nobody is using. They should be working on the industry standard.
- They don't have the expertise. Universities in Sask. Should teach more computer-related courses. People at colleges here in Sask. Are spending more money and time and learning less than they do at for example the Medicine Hat college.
- They have to go out of the city to obtain proper courses.
- They have to go to Calgary or Vancouver for the necessary training.
- They miss the thinking courses
- Training in new technologies and soft skills. English courses for immigrants during the evening is currently unavailable.
- Training is not on the cutting edge in Sask. Needs to be off the ponderous route education training generally takes.
- Training we need is quite specific and not offered in the city.
- Typically career college training does not prepare IT people for employment but for writing testing to get designations.
- U of S-yes they meet our needs. SIAST- no, not really. Heinz/CDI - No, they don't meet our needs. We need programmers who understand the latest languages & talented graphic designers to make those concepts real.
- We are always working with today & tomorrow's software and the schools are teaching yesterday's software.
- We are very behind with our programs, when we do go for training there is not enough course availability so we have had to go out of province.
- We have to send people away.
- We need quality & a diverse expertise regarding multiple software products & the knowledge associated with that. Most of the expertise seems to reside in the US. The development is largely there, consequently the knowledge is also.
- We need specialized computer people for our kind of work.
- We retrain them once they have been hired.
- What is offered take to much time/money away from work.
- What we need is not available.
- What we need taught isn't.